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COVER PHOTO: "Dust woman" captured in global press (9/11 – NY) died in September 2015.

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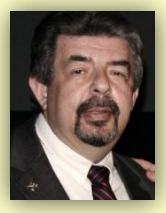


Editorial

Brig Gen (ret'd) Ioannis Galatas, MD, MA, MC (Army)

Editor-in-Chief
CBRNE-Terrorism Newsletter

Dear Colleagues,

Autumn 2015! And still we cannot say – is it rain or tears? People and nations are in constant confusion almost about everything,

Starting from Greece: Another election took place on September 2015. For what? Most probably for the same party elected 8 months ago, to rule again… I am wathing the news while writing this editorial and I am too tired to brake the TV set into pieces – perhaps because I cannot afford to buy a new one! They are now analyzing why this party won and why the second one lost and why they do not cooperate for a common cause and many other BS (excuse my language). Not a single word on how we will move forward and exit the crisis we are in the last 5 years or so. Endless discussions about the humanitarian crisis and the capital controls, the poor and the unemployed but not a single word about the people which constitute the backbone of the nation – the working force, people who spend years to study and years as professionals now hoping for a silly pension and pray no new taxes will be announced. Greeks are beginning to realize that nothing will change if we continue to follow the same pattern of governance where too much democracy neuteralizes almost any effort for constructive activities and actions. We need a ruler to order things and apply heavy penalties for those not obeying the rules. Simple as that. If you leave democracy to the people, democracy will never make it in the ICU.

Second issue is the population movement mainly from Syria and the rest of the world towards Europe. Here along with ordinary tears we have also "crocodile tears" when little boys or girls are drown and found lying in the beach somewhere in our continent. Europe realizes now (kind of late hase reaction observed in allergic reactions) what Greece and Italy (and Spain) were suffering for years. Immigrants, refugees, illegal immigrants, financial immigrants, jihadists – all dream Europe as the new Eden or Hell! Borders are closed, fences are constructed, permission to use plastic bullets is issued, people are gathered like sardines in camps or historical buildings (i.e. Dachau concentration camp in Germany) with no food, water or a shelter against adverse weather phenomena (winter is coming). Turkey is profiting from human smuggling and trafficking while EU countries accuse each other for current chaotic situation – and almost all of them blame Greece for not been able to stop the incoming flow of hopeless people. I only wished Greece to be located in Greenland in a bubble of its own! They speak about military actions; camps outside EU; financial support of Turkey (more money – great!) and many other stupid plans. But they do not speak about stopping the civil war in Syria. They do not know even now if they like Assad or not and what they are going to do about it. And do it yesterday! Just a few words spoken about the immense Russian military presence in the area – again Putin proved to be a better chess player than all the highly paid analysts and state consultants that speak about our part of the world studying Google Earth!

And of course chaos would not be perfect if Islamic State was not progressing to the next step – that is the use (and production?) of chemical weapons (mustard; chlorine) against populace and enemies in various fronts (Kurds, Syria, Iraq) not to mention the fact that they possess radioactive materials and take advantage of the educated (in many scientific fields) recruited jihadists t serve their plans and ambitions. Many prominent analysts reassure the public that the phenomenon is local and that our world is not at threat. They will be the same experts that after a CBRE attack will make statements about how unexpected the attack was and that a new war on terrorism will solve the problem… as if they won any war so far!

Brazil – eleven months for the opening day of Rio 2016 Olympics and still no word about their CBRNE preparedness other than 60 nations are working for the security of this mega sport event. My estimate? Either a well kept top secret or most probably, a well kept "top nothing!"

I travelled to Norway in September. Oslo was one of the two cities in Europe I had never visited before (Venice is the other). Beautiful country, fantastic landscape (watching from above while landing and take off) and really nice, polite people. The only problem is that Norwegians as a whole are living into their own world believing that since they hurt nobody, nobody will hurm them back. I presented the topic "*CBRNE Mapping – Is the threat real?"* at the 10th CBRN Symposiet" held at the fantastic building of the Olso Militær Samfund and organized by my good friend Siri Andresen (Josi Tech AS). During my lecture, I showed a picture of the Anders Behring Breivik manifesto ("*2083 – A European Declaration of Independence*") – all of them recognized it. When I asked them how many had actually read all the +1500 pages long document, only one person replied… And when I showed them that from page 955 to page 1061 there was a specific entity addressing weapons of mass destruction

and detailed terrorist *modus operandi* they were skeptical (as if they did not really believed that). What was confronting from this symposium is the fact that very soon all Norwegian hospitals nation-wide will have to follow an obligatory CBRNE preparedness approach now in its final stage of approval deigned by the NBC Center located at the Ullevål University Hospital. Apart from the above I loved Norway for two additional reasons – the love and care people show to their dogs and the fact that it is the only contry that addresses my country as "Hellas" (in Nowegian) and not as Greece – I will write about this in the next issue of the Newsletter.

It seems that October will be a busy month and many things will happen – not good things! Automn weather will kill more people at sea; civil war in Syria will escalate; immigrants' crisis will peak and so will the EU citizens reactions; and perhaps Greek government will start working.

Take care and always keep in mind that no country is immune to terrorism and no country is far away from hot spots of our dear Earth!

The Editor-in-Chief

Critics question the need to equip EMS personnel with protective gear

Source: http://www.homelandsecuritynewswire.com/dr20150828-critics-question-the-need-to-equip-ems-personnel-with-protective-gear

There is a certain familiarity with the image of police officers in body armor and Kevlar helmets, preparing to take control of a location where an active shooter is present, or where civilians have been taken hostage. That image, however, typically does not include the Emergency Medical Services (EMS) personnel standing to the side.

These men and women always respond to an emergency situation, arriving with police and firefighters. Usually, they are told to stay to the side and wait until the area has been secured.

The simple fact is, however, that the longer a victim waits to be treated, the lower the likelihood of that victim's survival.

Police have been forced to adjust to the increased firepower and lethality of criminals' weaponry, adopting high power weapons and tactical methods. The necessity for increased protection has made its way to EMS, and not without controversy.

Though slow, change in attitude has been advancing even into small cities and towns.

The *Union Leader* reports that in Goffstown, New Hampshire, Fire Chief Richard O'Brien purchased $11,000 of protective equipment for his EMS crews.

Now, a pair of Kevlar helmets and ballistic vests will ride along with other gear in two separate ambulances, available to help medical personnel get inside a shooting scene sooner to treat the wounded.

The state this month is conducting its first joint training session with police and emergency medical services crews, involving handling an active shooting scene and treating victims more quickly.

Emily Martuscello, an exercise training officer with New Hampshire Homeland Security and Emergency Management, told the *Union Leader* that, "It goes over law enforcement tactics and the response to a shooter, as well as a new concept that is a best practice of

what we call warm zone EMS, which is law enforcement securing the area in a building and allowing EMS to get into a building to treat patients quicker than waiting to search the whole building and deem the whole thing clear."
Weighing about forty pounds, the armor is capable of stopping rounds from handguns, nearly all rifle

rounds, and all armor-piercing rounds, so EMS personnel are well protected.
While EMS crews throughout the country have adopted body armor in one form or another, some jurisdictions have taken protection to the next level.

Earlier this year, the city council of San Leandro, California, held a special meeting to allow residents to express their views regarding the city's plan to purchase a medevac vehicle, in essence an armored vehicle generally used by police tactical teams. The difference is that the interior of the vehicle is fitted out as an ambulance rather than an assault vehicle.
As reported by abc7news.com, many of the residents were opposed to the purchase of the vehicle.
The city's police department said they had borrowed the medevac nine times in the preceding two years. Their position was opposed by residents referring to the vehicle as a "tank." Those criticizing the police maintain that the medevac could be put to more sinister use, and they join many others who express concern about the "militarization" of police forces throughout the country.

Repurposing wasted food would feed the hungry, create jobs

Source: http://www.homelandsecuritynewswire.com/dr20150828-repurposing-wasted-food-would-feed-the-hungry-create-jobs

Aug 28 – Roughly one third of all global food gets wasted. In the United States, that number is even higher, with **nearly 40 percent of all food going to waste**, making it one of the most wasteful countries in the world. Researchers have developed a new model for recovering would-be wasted — or surplus — food and repurposing it to feed hungry people, generate revenue, and even create jobs. The model — Food System-Sensitive Methodology (FSSM) — was recently piloted in West Philadelphia. The researchers say that **applying FSSM nationally would likely yield about 1.1 billion pounds of recovered wasted food annually.**
"If I offered you a bruised banana, you probably wouldn't be

interested," said Jonathan Deutsch, Ph.D., director of Drexel University's Center for Hospitality and Sport Management. "But what if I offered you some banana ice cream on a hot summer day? I bet you'd find that a lot more appealing."

It was this simple observation that inspired a new model for recovering would-be wasted — or surplus — food and repurposing it to feed hungry people, generate revenue, and even create jobs. The model was recently piloted in West Philadelphia, home to a large population of low-income and food insecure individuals, as part of the Environmental Protection Agency's Food Recovery Challenge with support from Brown's Super Stores.

Compiled by researchers from Drexel University, University of Pennsylvania, Cabrini College, and the EPA, the results were published in *Food and Nutrition Sciences*, a peer-reviewed international journal dedicated to the latest advancements in food and nutrition sciences. The report also projects the amount of food that could be saved if the program was replicated nationally.

Drexel U reports that according to the study, roughly **one third of all global food gets wasted.** In the United States, that number is even higher, with nearly 40 percent of all food going to waste, making it one of the most wasteful countries in the world.

Supermarkets — where fresh produce is routinely taken off the shelves for cosmetic reasons — are a major source of this food waste. It was here that the researchers chose to focus on saving food loss and channeling this food stream in new and efficient ways to those in hunger.

Drexel culinary arts and food science students collected thousands of pounds of bruised or misshapen fruits and vegetables from area supermarkets and developed products and recipes in the student-run Drexel Food Lab to put them to better use. These new, more appealing products could then be served or sold, diverting the food items from the landfill and creating a more sustainable food system, dubbed the Food System-Sensitive Methodology (FSSM) by the researchers.

To illustrate the model, Deutsch returned to the banana example.

"As soon as bananas are ripe, they are pulled from supermarket shelves because they'll be overripe by the time the consumer gets them home and may get thrown in the trash," he said.

Although many supermarkets now donate such surplus foods to soup kitchens or shelters, items like overripe or bruised bananas may still end up in the trash because they are unappealing, even to someone who is food insecure.

"We took a look at what was happening and realized that it was just shifting the problem and not actually solving it," said Deutsch.

Sustainable Materials Management

Food Recovery Challenge

Rethink

CHANGING HOW WE THINK ABOUT OUR RESOURCES FOR A BETTER TOMORROW

Next, the Drexel Food Lab looked at the food items that were commonly going to waste — bananas, tomatoes, greens, sweet potatoes — and developed low-cost, limited-skill ways to repurpose these surplus food items.

"So, for example, we took those brown bananas, peeled them, froze them and food processed them to create banana ice cream, which is much more appealing. If we then wholesaled those products back to the grocery store, they could be sold at nearly double the price."

In an evaluation of just one month of the program, the researchers found that 35,000 pounds of surplus produce were gathered from eleven area supermarkets. If the surplus produce was purchased for a reduced price of $0.25 per pound and was processed into value-added food products such as veggie chips, jams, and smoothie bases, it could then be wholesaled back to the same supermarket or other community-based retailers for $2.00 per pound.

These products could then be retailed at double the price, the researchers estimate, generating more than $90,000 in monthly

gross revenue, enough to support several employees at a family wage.
Applying FSSM, the preliminary results suggest that the potential production inputs nationally would be about 1.1 billion pounds annually. According to the researchers, the scalable economic, social, and environmental opportunities are substantial.
"An important way to address global food security is to make better use of the food already produced," the researchers wrote. "[The FSSM model] could help relieve chronic hunger and address the cost barriers that prevent these important sources of healthy dietary nutrients from reaching lower income people in the U.S.…The possibility for other foods, such as meats, grains and dairy, to increase diversion of food waste to hunger relief only brightens this outlook."

— Read more in Thomas H. O'Donnell et al., "New Sustainable Market Opportunities for Surplus Food: A Food System-Sensitive Methodology (FSSM)," Food and Nutrition Sciences 6, no.10 (July 2015): 883-92

Autonomous Snake-Robot Could Decrease Terror Threat

Source: http://i-hls.com/2015/08/autonomous-snake-robot-could-decrease-terror-threat/

Aug 27 – The Gaza strip tunnels are tunnels being dug by the Hamas and other terror organizations inside the strip as part of their fight against Israel. These tunnels are being dug under the border between Gaza and Israel in order to enter undetected into Israel, to be used as a place to hide, or as means to surprise the IDF soldiers in case they enter the Gaza strip.

It's possible that an American company has found an appropriate solution to the tunnel threat in Israel by using yet another technology simulating the animal kingdom. **Sarcos company** has revealed an Unmanned Ground Vehicle which **looks like a snake, means to be used by a vast variety of industries including public safety, defense, disaster recovery, infrastructure control, aerial and maritime territories, oil and gas etc.** The chairman and founder of the company, Ben Wolff, says that "[these] commercially available robotic products, and those in development, will save lives, prevent injuries and mitigate risk as they are deployed to perform some of the world's most dangerous and difficult tasks."
The robot is called **The Guardian S** and will be displayed in the United States on August 30th. According to the company, this robot-snake is the first of its kind to be autonomous and will be commercially available by the end of fall. The Guardian S weighs about three and half kgs and has a battery life of up to 16 hours. Furthermore, it can carry a set of sensors and provide video footage in real-time for two days and even allows vocal communication. It is intuitive to use and can be remote controlled. It can pass hard terrains, including climbing stairs and passing through pipes and narrow canals. It can even climb into and out of storage tanks, maritime and ground vehicles.
However, due to limitations in American regulations on international trade of weapons, it can only be sold to companies and government agencies inside the United States. If the vehicle cannot be purchased, the IDF could probably adopt the idea to cope with the

tunnel threat Israel has faced during the Protective Edge operation. It's best to combine a similar robot with the combat engineering corps, on top of intelligence means, and developed sensory technologies to locate the tunnels. It's also possible to think of other additions to supply the robot with, such as a bullet-proof armor, weapons or explosives.

It's Time To Make An Anti-Civilian-UAV System

Source: http://i-hls.com/2015/08/its-time-to-make-an-anti-civilian-uav-system/

We've heard about anti-tanks and anti-planes missile systems, but now, due to increasing security dangers caused by UAVs flying in restricted areas, the United States has begun working on some new solutions.

The research project meant to initiate technology for detecting and neutralizing UAVs while up in the air is still just starting out, but it turns out that at least one experiment in that field was already conducted. According to a source involved with the experiment, on last New Year's Eve the New-York police department was experimenting in locating a commercial UAV on a particularly busy Times Square and sending it back to its operator. The experiment encountered some difficulties due to interferences from media networks in the area, but it signifies the nationwide development efforts which include the Department for Homeland Security, the Federal Aviation Administration and the Department of Defense.

Due to a sharp rise in UAV use and following a series of worrisome incidents, the issue has become an urgent problem. The number of unauthorized UAV flights has gone up in the past year, bringing with concern for attempted attacks on commercial airplanes or attempts to use them as an assault weapon.

Among these worrisome incidents one can count the many UAVs flying near passenger planes, UAVs that interrupted fire-fighting efforts and even those who assisted smuggling drugs from Mexico into the United States. An even more distressing incident was when a drone landed on the White House lawn, after its operator lost control of the vehicle. Most UAV operators are amateurs breaking federal restrictions such as the restriction of flying UAV any higher than 120 meters. One of the reasons for the difficulties to enforce law in this field is the American congress' objection in

2012 for the FAA's regulations initiative for private UAVs.
For now the police is interested in creating the possibility to take control over UAVs in crowded places, such as Times Square, and land them back in their owners' hands. "We can't shoot it out of the sky. We have to come up with something that's kind of basic technology so that if something happens, the drone or device will just go right back to the operators", one of the sources involved in the project said. "If I know the transmission codes the drone is using, I can control that object".
More than a million UAVs of all kinds are expected to be sold in the United States this year, compared to 430,000 sold last year. Managers of UAV industries have begun to come up with solutions to relieve concerns about these flying platforms. Some have offered the solution to be a pan-industrial agreement that requires software to be put in UAVs which prevents them from flying over the height limit or near sensitive areas.
The challenge with which the United States is dealing is well-known in Israel as well. On October 2012, Israeli air force planes have intercepted a UAV which is presumed to belong to Hezbollah in the south of the country after it penetrated Israel aerial territory and flew over sensitive facilities. A cooperation between Israeli and American Hi-Tec companies to face this common threat, will be sure to produce results soon.

Autism in the IDF: Meet the Soldiers of Intelligence Unit 9900

Source: https://www.idfblog.com/blog/2014/04/10/autism-idf-meet-soldiers-intelligence-unit-9900/

Special intelligence Unit 9900 is dedicated to everything related to geography, including mapping, interpretation of aerial and satellite photographs and space research. Within this unit there is a small unit of highly qualified soldiers, who have remarkable visual and analytic capabilities. They can detect even the smallest details, undetectable to most people.
The uniqueness of this elite group of intelligence soldiers in Unit 9900 lies in the fact that they are all diagnosed on the autism spectrum. We interviewed Col. J, the commander of Unit 9900, in order to learn more about this inspiring group of soldiers.

A soccer field in Gaza. In depicts a before and after image of a hidden weapons Cache.

First time in history

"After many doubts and expectations the project came to light after almost a year of processing. There were many problems along the way. The actual process took about a year and I want to say that we started with the assumption that this could, should and would succeed," says Colonel J, confessing that the success of this project exceeded the optimistic expectations of its initiators. "The concerns were understandable, because I knew nothing about autism. The result was a task of trial and error. Everything we did was happening for the first time in the history of the IDF. We planned, worked and focused until we achieved success."

How does this group fit in with the other soldiers?

"They have excellent relations with the soldiers of the unit – from time to time, out of the building where they work I see them sitting with others in the unit, having lunch or just having a cup of coffee. No one forces them to do so. It is very natural, and I think that says it all."

What type of work do they do?

"Their job is to take visual materials from satellite images and sensors that are in the air. With the help of their officers and decoding tools, they analyze the images and find specific things they need in order to allow those who are planning a mission to get the best data of the area."

How it all began–The RR Plan

Mr. V and Ms. S, veterans of the IDF and the Intelligence organizations, introduced an idea – to utilize the special strengths of people on the autistic spectrum for the needs of the IDF and Israeli intelligence. They contacted Unit 9900, who showed great interest in the idea and decided to be a partner for the first trial – interpretation of aerial and satellite photographs.

They then Contacted the Ono Academic College – a private academic institution and registered NGO, which also has a school for health professions. Ono Academic College has a vision of "Changing the face of Israeli society," and therefore its management decided to Join the initiative, and together they set up the RR Program – (*Roim Rachok* – which in Hebrew means looking far beyond the horizons).

The aim of the RR Plan is to teach people on the autistic spectrum professions that utilize their special abilities, thus creating a Win-Win effect. The courses take place in the Ono Academic College. After the students finish the 3 month course, they join the army, where the RR program is still involved in guidance and assistance of the soldiers and their commanders.

Today, when everyone can see the success of the first trial course graduates, the RR plan is developing two more courses that utilize other strengths of the autistic spectrum. One course is for software quality assurance (QA) and the other is for information management. Both courses are developed in cooperation with Intelligence Units of the IDF, which will eventually be the home units for the course graduates.

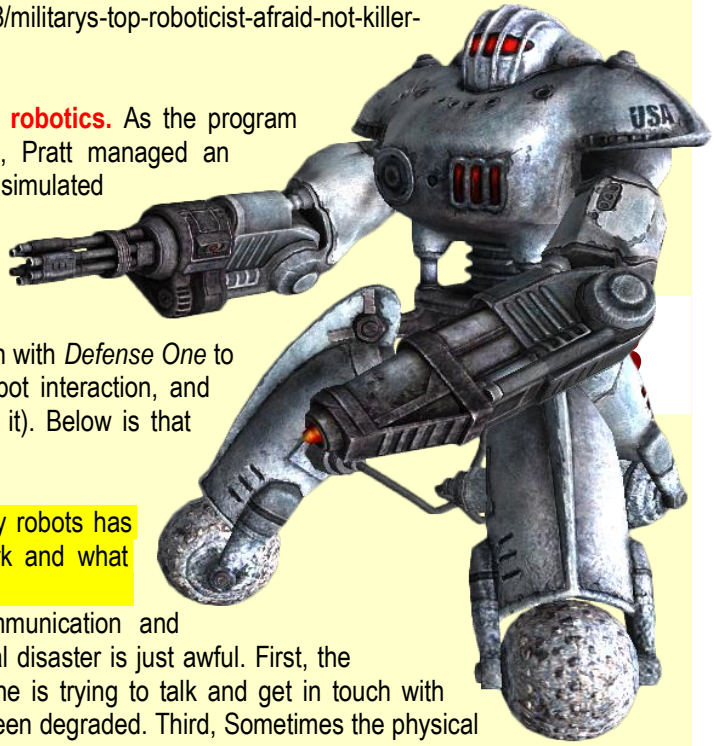
Unit 9900's special contribution

It is important to remember that people on the autism spectrum have strengths in music, mathematics, as well as the visual field. These autistic soldiers of Unit 9900 play a major role in intelligence gathering–a role not easily filled due to the difficulty of the task of this unit. The IDF believes in the ability of these autistic soldiers and will continue to work for their advancement in military and civilian life.

Here's What The Military's Top Roboticist Is Afraid Of (It's Not Killer Robots)

By Patrick Tucker

Source: http://www.defenseone.com/technology/2015/08/militarys-top-roboticist-afraid-not-killer-robots/119786/?oref=d-river



Gill Pratt might be called the military's top mind in robotics. As the program manager for the DARPA Robotics Challenge, or DRC, Pratt managed an international competition that brought 24 teams to a simulated disaster zone in California, complete with rubble and disrupted communications, to explore how humans and robots could work together in emergencies like the Fukushima Diachii nuclear meltdown.

Pratt, who is stepping down at the end of August, sat down with *Defense One* to discuss the Robotics Challenge, the future of human-robot interaction, and how to stop a robot uprising (he's not losing sleep over it). Below is that exchange, edited for clarity.

Defense One: Leading a competition to build emergency robots has surely taught you a lot about how these machines work and what happens when they don't. What did you learn?

Gill Pratt: The No. 1 issue in emergencies is communication and coordination. Radio communications in a typical disaster is just awful. First, the cell network is overloaded because everyone is trying to talk and get in touch with each other. Second, the infrastructure has been degraded. Third, Sometimes the physical nature of the place where the disaster occurred can be very bad for wireless comms. In Fukushima, there was shielding inside the reactor buildings - zinc plates - and rebar to keep radiation from getting out. The shielding prevented wireless signals from getting out, also.

Communications, Command, and Control is the hard part in an emergency where you've got hundreds of people trying to help. In the future, if the emergency is very bad and the environment is dangerous for human beings, some of the assets we bring to bear won't be flesh and blood, but machines. How do we integrate them into the general response even if communications is degraded? That's the question we were trying to get at in the DRC it's great to have bots that can do the work of humans in a dangerous place but if the comms are bad, how do you get them to work as a team?

Defense One: Was there a particular moment of satisfaction or victory?

Gill Pratt: It was when the Carnegie Mellon machine and the KAIST machine performed at reasonable speeds right after they entered the building. KAIST put out a sped-up clip showing their whole run. What you see is that they don't slow down. You can't even tell that comms. are out most of the time. [KAIST] goes and drills a perfect circle in the wall. That's all being done locally by the machine itself.

How did it do that? First, there's autonomy in the robot that can do actions at the task level. If you give it the task — "cut the hole in the wall" — it can do that without talking back and forth to you. Second, there's simulation software on the operator control station, which is showing the humans in the safe zone what's going on the other side. Because I know the robot's software is running and I know where things were the last time we got to talk, I can predict where the robot is now. From the human point of view, it's as if the comm. link is good even when it isn't. It showed that you can give a human being in a safe zone the illusion that they are actually watching what's going on on the robot side, so when the comms. come back the human can make the decision about what to do next in a seamless way.

Defense One: It seems that emergency robots will work best in a controlled environment where you've mapped the environment for them beforehand?

Gill Pratt: There's a slope. If you are in a totally unstructured environment, figuring things out is very hard. In a structured environment like a lab, you know exactly where things are, so it's very easy. Right now, we're in a stage where robotics is good at things between those two extremes. In cases where we're trying to mitigate the extent of the disaster the typical setup is a structure that humans have built. There are blueprints, or humans have done a fly through with a UAV. There's a bit of a map. Is it a perfect map? No. The robot must adapt to register its own coordinates with the map and with what it expects to be there. It must adapt to imperfections. And the disaster itself may have had an effect on the building, but it's not totally unstructured data.

In Fukushima, the stairs had been worn down by people walking up and down over many years. The blueprints and the maps helped to some extent, but you need to bridge the rest of the way, with feedback from the robot itself to adapt to imperfections. We've tried to do the same thing: give the teams an idea, roughly, of where things would be.

Defense One: Before the teams brought their robots to the DRC finals, DARPA held a virtual event — a simulation to evaluate the teams' software.. Were you afraid someone would cheat by introducing malware into the cloud environment?

Gill Pratt: We had no reason to believe the teams were cheating, but we took steps to prevent it anyway. The tool we came up with, used in the virtual robotics challenge and developed by the Open Source Robotics Foundation, was a simulation engine run on the cloud. That means it can be run by anyone in the world. That was very, very new. Every simulation that we had was in a closed world. We built these walls around the teams so we never had one team and a second team on the same virtual stage at the same time. If a team were able to introduce any code, good or bad, only their score would be affected, so they had no reason to put anything bad in.

What that meant is that they couldn't interfere with each other. In a real emergency, you wouldn't want that. The idea is to have lots of people working cooperatively. You would have to trust a group of machines and humans to work together.

The question is: what if one of the people in the group is bad? I don't think it's a technological issue so much as a human security issue. I'm not an expert in the psychology of disasters but I know that they can attract people who's "help" you don't want to have. You need to filter out who is official and who is not. It's much more difficult to defend against an insider threat.

Defense One: Do you worry that future consumer robotics products won't have the sort of software security that's typical of machines for the military? And if future robotic intelligence and processing is cloud-based, then could malware uploaded to one robot affect an entire product line of commercial robots, causing breakdowns or worse?

Gill Pratt: I worry about it for every system out there, whether it's civilian or defense. We have a yet-unsolved problem with security. The great advantage of having robots that can

communicate with each other, and having the intelligence that they use be on the cloud, is that they can share things. When one machine figures out how to grab something, suddenly all of them know how to do it, too. That's the upside.

The downside is that when the machine is infected because of malware that came in, then they all are. That can be awful. I know that DARPA has looked at how to fix this, how to break the effects of software monoculture so that all of the systems aren't the same. I worry about it a great deal, but the robots that we've been developing in the DRC can't be made dangerous because of malware. We're talking about lab prototypes that we're using to understand this comms. Issue – their physical power is actually very low.

In terms of when you would deploy this thing, it's still many, many years off. First the cost has to come down, the effectiveness has to come up, and the reliability has to come up. Along the way — you're absolutely right the security of the network has to be figured out. At the DRC, we were just trying to see how effectively man and machine can talk to each other even when the communication line keeps cutting out.

Fukushima robot

Defense One: If you aren't worried about robots being hijacked to become dangerous, what's your biggest security concern when it comes to future robots?

Gill Pratt: How do we protect the information that the robot picks up, not even during a disaster, but in other parts of life? Robots get to see. I would love to have a machine help me when I grow old — but I don't want all the information, all that the robot is watching, to be made public. How do we protect against that? I don't know. On the military side of things, if the machines are helping our forces do what they're doing, how do we make sure that no one is watching? These are serious questions, but they aren't specific to the robotics field. They're specific to IT.

This is an issue that keeps coming up, and you don't need a robot for it to become an extremely difficult issue. People have this notion that robots are dangerous because they have legs, so perhaps they can come get us. The danger is not in the legs. It's in the camera and the microphone. We're the robot. We carry cell phones around all over the place to the worst places they can be and we trust whoever it is to audit the software to make sure it has no malware in it. There's a lot of trust there. I'm very worried about those systems. I don't worry about the robot on the loose doing physical damage. The valuable stuff is the data. That issue is

huge and transcends whether it's a robot, a cellphone, or a laptop. If you solve it for the laptop and phone, you'll solve it for the robot as well.

Defense One: You've emphasized that neither you nor the Defense Department is trying to build armed ground robots through this competition. But other nations don't share those reservations. Russia has deployed armed robots that can fire autonomously to guard missile sites. If the Russian government, hypothetically, were to approach you for advice on how to make that autonomous armed ground robot system work, what would you tell them?

Gill Pratt: For a number of years to come, for situations of human time scales, the decision of whether to fire or not is one that a human will be best at. The chance of making a military situation much worse by having a machine autonomously make a mistake outweighs the benefit.

There are some cases where you have no choice. For instance, the Phalanx [Close-In Weapon System] gun that's on ships that shoots at incoming missiles has been around for decades and it's an armed, robotic system. It has to work beyond human speeds. The 2012 DOD directive on autonomy talks about that. The key is quality control, making sure that that machine can't make an error. The Phalanx looks at the size and speed of the object coming toward it and if it determines that the object coming is so fast and so small it couldn't possibly have a person in it, it shoots.

In those systems where we do have to arm an autonomous system — we have them now and I'm sure we will have them in the future — we must ensure good quality control over the target-detection software to make sure the system never makes an error. The U.S. will likely do that best. I worry more about the nation that doesn't care as much as the U.S. does if errors are made.

We should also keep in mind that human beings make a lot of mistakes in war when they fear for their lives. There's reason to think these systems can make things better. They can make things better by deciding when NOT to shoot.

Defense One: Earlier in the summer, several noted technologists, including Elon Musk and Stephen Hawking, signed a letter urging governments to ban the development of autonomous weapons. *Defense One* ran an essay by one of the letter's co-authors as well as one by a critic of the proposed ban. What's your position on the letter?

Gill Pratt: I believe that now is the wrong time to be making decisions like this. Having the discussion is fine. But saying, "No, we're not going to work on this" is wrong. First, we need to understand what's possible. We can make a choice not to use what we develop - we have made choices like that with bio-weapons, for example. We made a choice to ban them. In the case of lethal autonomy, we need to learn a whole lot more and there's a whole of good that they can do, too, in stopping lethal errors from happening. I would like to see where we can get to with that. There are also whole lot of reasons why a ban is impractical right now. To call for one now based on an emotional fear of a far future thing, this is the wrong time to do that.

Defense One: You, clearly, are not worried about a robot uprising.

Gill Pratt: I'm extremely optimistic about the ability of robots to help us. I would like a machine to help me drive my car; I would like a machine to help me carry my backpack on a hike. There are lots of ways for these machines to make life better. My outlook is positive. I recently wrote an article titled "Is a Cambrian Explosion coming for Robotics?" in The Journal of Economic Perspectives. It represents my views and not those of DARPA or the Department of Defense. It talks about some of these issues.

The Cambrian explosion was a period 540 million years ago when life became very diverse on earth. One of the leading theories as to why is that the Cambrian is when eyes were first developed. Our post-Cambrian ancestors could see mates and threats at a distance. Life just took off. I think we're reaching the same point in robotics because, for the first time, these machines can see and understand their environment. At the DRC you began to see a little of that in machines that could do some of the work on their own using vision. We are at a tipping point. But it's very, very hard to figure out exactly when we will actually tip. I think that when it occurs it will be fast because it will build on itself.

We thought that people's responses to the robots competing the DRC would be fearful; "oh it looks like a Terminator, I should be scared of it." We discovered this other effect. The effect was extreme. When the robot fell down, people went "Oh my god!" At one point, the MIT bot fell down and a woman at the press briefing asked, almost with tears in her eyes, "Do you know if the MIT robot is OK?" I don't quite understand it but I suspect that the bond between people and robots will be very strong

Patrick Tucker *is technology editor for Defense One. He's also the author of The Naked Future: What Happens in a World That Anticipates Your Every Move? (Current, 2014). Previously, Tucker was deputy editor for* The Futurist *for nine years. Tucker has written about emerging technology in* Slate, The Sun, *MIT* Technology Review, Wilson Quarterly, The American Legion Magazine, *BBC* News Magazine, Utne Reader, *and elsewhere.*

Could Science Defeat Terrorism? Using Robots to Hunt Down ISIS

By Lucas Bento

Source: http://thediplomat.com/2015/08/could-science-defeat-terrorism-using-robots-to-hunt-down-isis/

The prospect of intelligence triumphing over ignorance is always encouraging.

As a secular method to understand and explain the world, science can reveal gaps and holes in religious dogma, and by doing so, challenge extremist religious beliefs that do not hold up to observable experiments. As the world becomes increasingly networked (thanks in part to science), access to scientific knowledge may disrupt the very belief systems that are exploited and manipulated to recruit and motivate terrorists.

But it could take years if not decades before science as a knowledge system infiltrates past the authoritarian walls of religious fundamentalism.

In a more practical sense, applied science, and particularly artificial intelligence, may provide more immediate tactical benefits.

Enter killer robots, artificially intelligent lethal machines capable of selecting and engaging targets without human intervention.

Killer robots have received considerable bad press in recent months. Many scientists, nongovernmental organizations, and states have called for a preemptive ban on their development and eventual use on the battlefield. They fear that lethal autonomous robots may increase the likelihood of war and could one day pose an existential threat to humankind.

This anxiety is nothing new. In an article published in 1863 entitled "Darwin among the machines," English writer Samuel Butler argued that the "the machines will hold the real supremacy over the world and its inhabitants." The author recommended that as a precaution, mankind should return to the "primeval condition of the race."

Technophobic–or perhaps neophobic, the aversion to all things new–sentiments have ebbed and flowed throughout history, peaking at times when revolutionary technologies were introduced in society. Seventeenth century Japan rejected the use of firearms, then an "advanced military technology." Nineteenth century England grappled with the Luddites, who smashed mechanical looms for fear of putting people out of work.

In many ways, artificial intelligence is different because it raises unique issues about control, legitimacy, and accountability. But could the pessimistic prognoses about killer robots miss the forest for the trees? What if robots were used as partners of peace and promoters of global order and justice?

Or, importantly, as terrorist hunters?

The war on ISIS shows no end in sight. The group's unrestrained campaign of violence in Iraq and Syria continues to reveal new shades of brutality. Its disregard for the well-being of humanity is unrivaled in the 21st century. I say "humanity" because ISIS' political war is costing the lives of the innocent by using tactics that are perhaps best suited to earlier iterations of the human race. Rape, beheadings, torture. Repeat.

But I could just as well say that the group has no respect for the "humanities," the branch of human learning that studies human culture. ISIS' iconoclastic crusade against Syrian and Iraqi cultural heritage is well documented, both by the group itself and the international community.

The group's obliteration of numerous World Heritage Sites, including the recent destruction of the Baalshamin temple in Palmyra, and of priceless cultural artifacts around the region are part of a systematic campaign to enforce their puritanical interpretation of Islam. For ISIS, cultural cleansing is necessary to wipe the slate clean and build a caliphate free from idolatry.

As a commercial hub linking the Far East with the Roman Empire, the city of Palmyra marked "the crossroads of several civilizations in the ancient world." Its destruction has been condemned as a "war crime" by UNESCO.

Irina Bokova, UNESCO's chief, deplored these actions as the "most brutal, systematic" destruction of cultural heritage since World War II.

These ancient sites are symbols of humanity's cultural history: a reminder of how the web of human relations intersects and knowledge flows interact. This is what makes ISIS particularly dangerous: not only are they murdering members of communities but also destroying the cultural foundations upon which such communities were built.

Culture is not some whimsical collection of pretty paintings and table manners; it is a reflection and embodiment of social identity. Through language, art, music, knowledge, and religion we continuously give meaning to our social existence. By destroying these cultural anchors, ISIS is now on an ideological path that would make Hitler and Malan throw evil nods of approval.

Earlier this year, Dario Franceschini, Italian Minister of Cultural Heritage and Tourism, called for the formation of a UN military force to protect the world's cultural heritage. Killer robots would be particularly useful against groups like ISIS, where political costs are too high for major military powers to put boots on the ground, and political momentum too low to justify human military intervention to protect sites of cultural importance.

In addition to using robots offensively to fight terrorists, robots could be used to promote peaceful objectives, such as protecting humanitarian convoys, refugee camps, schools, hospitals, and museums.

First iterations will likely be semi-autonomous, featuring some level of human supervision and control. Once the technology is sufficiently capable of meeting the stringent standards of international humanitarian law, such as discriminating between combatants and civilians, as well as operational safety, such as recognizing friendly fire, greater autonomy may be delegated to the robot.
ISIS may be defeated before killer robots ever see the light of day. But the value of autonomous lethal technology, operating within legal and morally sound grounds, cannot be underestimated to solve global security problems. Scientific advancements–and its evolving creations, like artificial intelligence–must be given serious thought as a bridge to peace, or at the very least as a weapon to defeat terror.

Lucas Bento is an attorney in New York specializing in complex litigation and international arbitration.

Looted in Syria – and sold in London: the British antiques shops dealing in artefacts smuggled by Isis

When Mark Altaweel agreed to hunt for 'blood antiquities' in London dealerships, he was expecting more of a challenge. But as the archaeologist discovered, relics from the ruins of Palmyra and Nimrud are now on display in British shops – and so far no-one has worked out how to stop it.

▶ **Read more at:** http://www.theguardian.com/world/2015/jul/03/antiquities-looted-by-isis-end-up-in-london-shops

Why Are So Many Muslims in Prison?

By Johanna Markind
Source: http://www.meforum.org/blog/2015/08/islam-prison

Aug 30 – The current issue of the *New Yorker* reports that, according to Paris-based Iranian sociologist Farhad Khosrokhavar, "**of France's 64,000 prisoners, up to 60% are Muslim. (Muslims are thought to compose only 8% of the population**.)"
Based on data from 2011, Pew Research Center estimated that Muslims made up 9% of the 1,598,780 state and federal prisoners **in the United States.** Pew also reported that as of 2010, about 0.8% of the U.S. population was Muslim, up from 0.6% in 1990. Data allegedly provided by the federal Bureau of Prisons reported that, as of 1997, **Muslims made up 7.27% of the federal prison population.**

In other words, Muslims are overrepresented in the French prison population by 7.5 times their percentage of the population. In the United States, although their overall percentage is smaller, Muslims are overrepresented in the prison population by 11.25 times their percentage of the population.
Why? A couple of possible explanations spring to mind, neither one of which is exclusive.
One possibility is that Muslims may be committing crimes at a higher rate than other groups.

Another is that large numbers of prisoners are converting to Islam. There is evidence that this is in fact the case. The *New Yorker* article offers a sociological explanation of why and how this happens in French prisons. Conversion also appears to be common in U.S. prisons. *See* also here, here, here, and here.
What makes this truly disturbing is the form of Islam to which prisoners are converting. Much has been written about the radicalization of Muslims in French prisons (for example, here, here, here, and here). It is also happening in U.S. prisons (*see* here and here). Despite earlier efforts to obscure this issue, it isn't going away any time soon. Expect it to get worse before it gets better.

***Johanna Markind** is associate counselor at the Middle East Forum.*

EDITOR'S COMMENT: Similar is the situation in Greek prisons – 60%-70% are Muslims divided into Sunnis and Shiites. Most probably in prison conversion is much lower. There are so many incoming illegal Muslim immigrants who commit to kind of crimes: steal to survive and rape because of different perception on women into their countries and religion.

Migrant crisis: Why Syrians do not flee to Gulf States?

Source: http://www.bbc.com/news/world-middle-east-34132308

This cartoon was published in Saudi Makkah newspaper

Sept 02 – As the crisis brews over Syrian refugees trying to enter European countries, questions have been raised over why they are not heading to wealthy Gulf States closer to home.
Although those fleeing the Syrian crisis have for several years been crossing into Lebanon, Jordan and Turkey in huge numbers, entering other Arab states - especially in the Gulf - is far less straightforward.
Officially, Syrians can apply for a tourist visa or work permit in order to enter a Gulf state.
But the process is costly, and there is a widespread perception that many Gulf States have unwritten restrictions in place that make it hard for Syrians to be granted a visa in practice.
Most successful cases are Syrians already in Gulf States extending their stays, or those entering because they have family there.
For those with limited means, there is the added matter of the sheer physical distance between Syria and the Gulf.

Not welcome?

This comes as part of wider obstacles facing Syrians, who are required to obtain rarely granted visas to enter almost all Arab countries.

Without a visa, Syrians are not currently allowed to enter Arab countries except for Algeria, Mauritania, Sudan and Yemen.

The relative wealth and proximity to Syria of the states has led many - in both social and as well as traditional media - to question whether these states have more of a duty than Europe towards Syrians suffering from over four years of conflict and the emergence of jihadist groups in the country.

Image copyright Twitter Image caption Some of the photos being circulated on the Arabic hashtag **#Welcoming_Syria's_refugees_is_a_Gulf_duty**

The Arabic hashtag **#Welcoming_Syria's_refugees_is_a_Gulf_duty** has been used more than 33,000 times on Twitter in the past week.

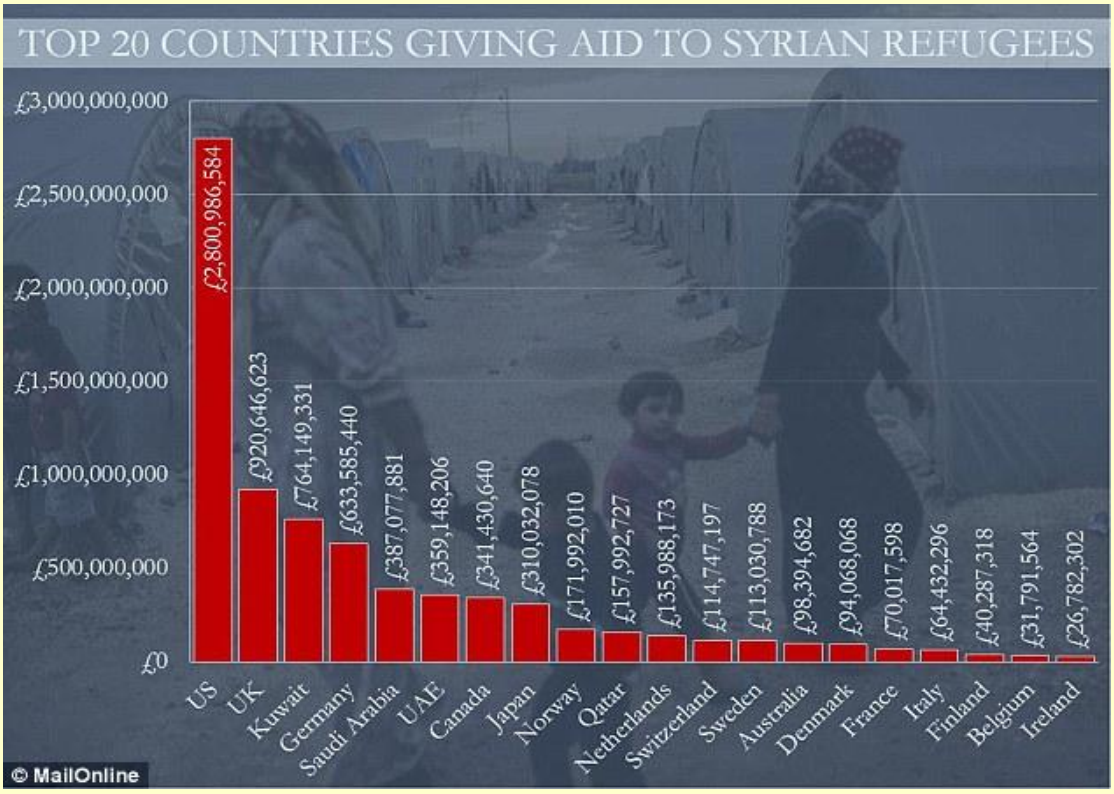
Users have posted powerful images to illustrate the plight of Syrian refugees, with photos of people drowned at sea, children being carried over barbed wire, or families sleeping rough.

A Facebook page called The Syrian Community in Denmark has shared a video showing migrants being allowed to enter Austria from Hungary, prompting one user to ask: "How did we flee from the region of our Muslim brethren, which should take more responsibility for us than a country they describe as infidels?"

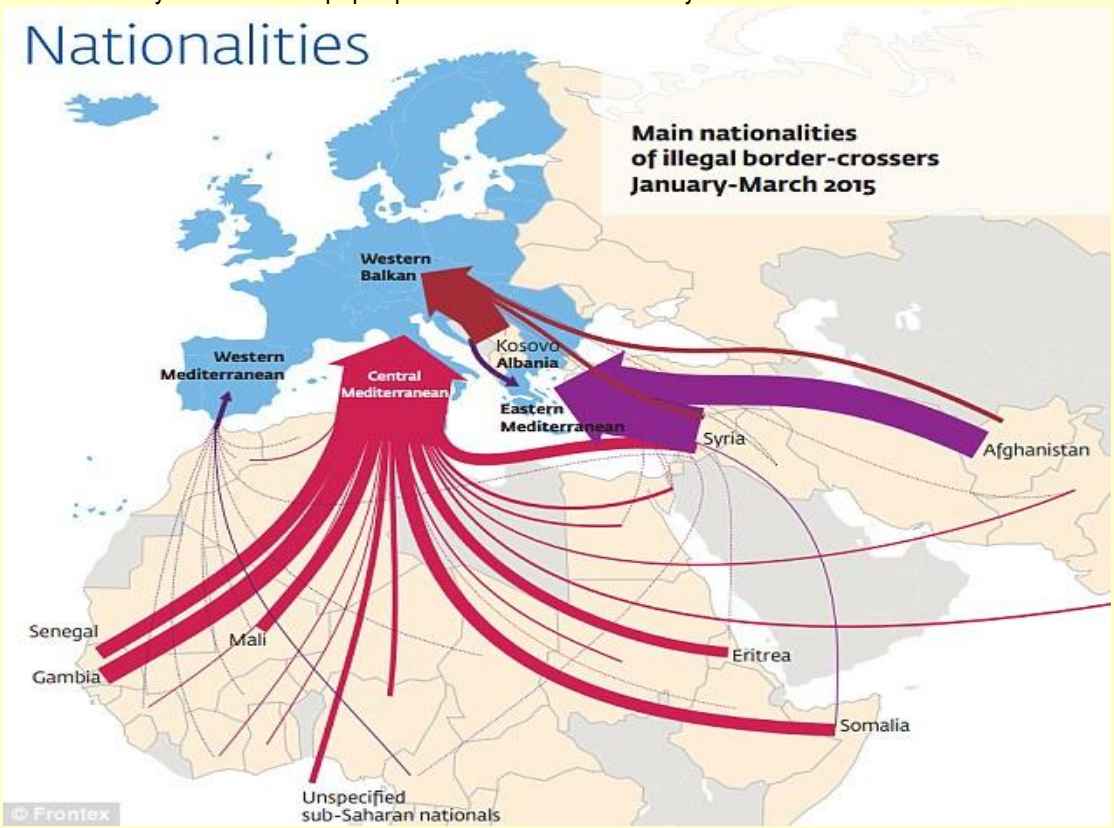
Another user replied: "I swear to the Almighty God, it's the Arabs who are the infidels."

'Let them in!'

The story has also attracted the attention of regional press and political actors.



The Saudi daily Makkah Newspaper published a cartoon - widely shared on social media - that showed



a man in traditional Gulf clothing looking out of a door with barbed wire around it and pointing at door with the EU flag on it.
"Why don't you let them in, you discourteous people?!" he says.

The commander of the opposition Free Syrian Army (FSA), Riyad al-Asaad, retweeted an image of refugees posted by a former Kuwaiti MP, Faisal al-Muslim, who had added the comment: "Oh countries of the Gulf Cooperation Council, these are innocent people and I swear they are most deserving of billions in aid and donations."

But despite the appeals from social media, Gulf States' position seems unlikely to shift in favour of Syrian refugees.

The trend in most Gulf States is towards relying on migrant workers from South-East Asia and the Indian subcontinent, particularly for unskilled labor

In terms of employment, the trend in most Gulf states, such as Kuwait, Saudi Arabia, Qatar and the UAE is towards relying on migrant workers from South-East Asia and the Indian subcontinent, particularly for unskilled labor.

While non-Gulf Arabs do occupy positions in skilled mid-ranking jobs, for example in education and health, they are up against a "nationalization" drive whereby the Saudi and Kuwaiti governments in particular are seeking to prioritize the employment of locals.

Non-native residents may also struggle to create stable lives in these countries as it is near impossible to gain nationality.

In 2012, Kuwait even announced an official strategy to reduce the number of foreign workers in the emirate by a million over 10 years.

EU states should take 200,000 more refugees: UN

Source: http://www.homelandsecuritynewswire.com/dr20150904-eu-states-should-take-200-000-more-refugees-un

Sept 04 – **António Guterres, the UN high commissioner for refugees, has called on European Union countries to admit up to 200,000 refugees as part of a large-scale relocation program which would be mandatory for all EU states.**

Guterres said the EU was facing a defining moment and must "mobilize full force" toward a common approach to the migration crisis.

U.K. prime minister David Cameron, modifying an earlier announcement, confirmed that the UK will provide settlement for thousands more Syrian refugees. Cameron said the British government would "act with our head and our heart" in response to the crisis and refugees' suffering. He is expected to offer more details of his plans later on Friday at a press conference in Madrid with the Spanish prime minister, Mariano Rajoy.

The *Guardian* reports that thousands of people remain outside Budapest's main railway station in what has in effect become Europe's newest refugee camp. Hungary yesterday closed its main border crossing with Serbia after about 300 people escaped from a nearby refugee camp.

Hungarian politicians are now debating tough new anti-immigration measures, including criminalizing illegal border crossings and tampering with the new anti-immigrant razor-wire fence erected along the Serbian border.

Guterres, who has been in office since 2005, said: "Europe cannot go on responding to this crisis with a piecemeal or incremental approach.

"No country can do it alone, and no country can refuse to do its part. It is no surprise that, when a system is unbalanced and dysfunctional, everything gets blocked when the pressure mounts.

"This is a defining moment for the European Union, and it now has no other choice but to mobilize full force around this crisis.

"The only way to solve this problem is for the union and all member states to implement a common strategy, based on responsibility, solidarity and trust."

He added: "People who are found to have a valid protection claim in this initial screening must then benefit from a mass relocation program, with the mandatory participation of all EU member states.

"A very preliminary estimate would indicate a potential need to increase relocation opportunities to as many as 200,000 places."

EU foreign ministers are due to meet Friday to discuss the continent's refugee crisis.

Guterres's appeal followed a joint call by France and Germany for binding EU quotas which would require all EU member states to share the burden of the influx of migrants and refugees. The wave of tens of thousands of refugees has hit Greece, Italy, and countries in south-eastern and central Europe especially hard.

Agence France-Presse was told by a European source that Jean-Claude Juncker, the European commission president, would next week unveil a plan for the relocation of at least 120,000 more refugees.

The Hungarian prime minister, Viktor Orbán, voiced his opposition to any EU action increase the number of refugees and asylum seekers beyond the current limits. He said the flow of migrants into Europe was endless and if the EU did not protect its borders, tens of millions more may come.

"The reality is that Europe is threatened by a mass inflow of people, many tens of millions of people could come to Europe," he said last Friday. "Now we talk about hundreds of thousands but next year we will talk about millions and there is no end to this."

Referring to the fact that most of the current refugees and asylum seekers nocking in Europe's door are Muslims, Urban added: "All of a sudden we will see that we are in minority in our own continent," he said, urging Europe "to show strength in protecting our borders."

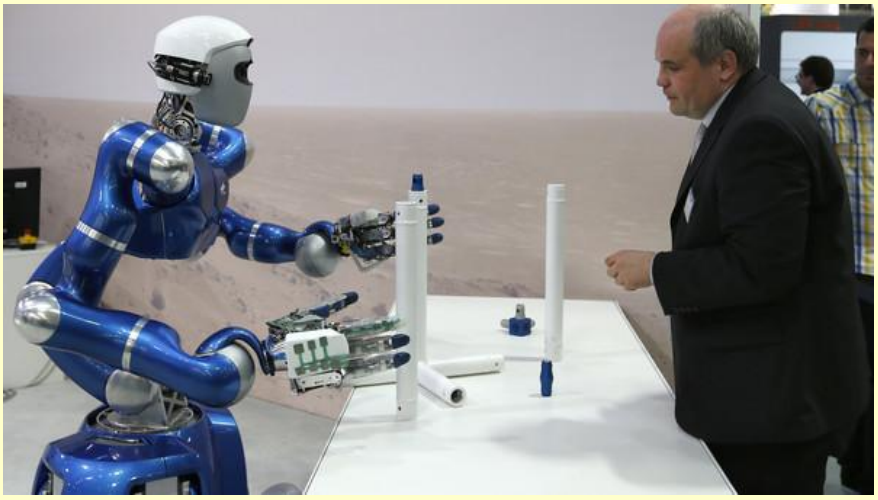
EDITOR'S COMMENT: It would be great if former Portuguese Prime Minister, António Guterres tell us how many refugees and illegal immigrants his homeland will accept before proposing these huge numbers for Europe. "Protected" by Spain and the big Ocean his country is difficult to be invaded. What if Portugal was in Italy or Greece? Perhaps UNHCR is heading for a third Nobel Prize…

Robots and AI: Utopia or Dystopia?

By Michael Roberts

Source: http://cesran.org/robots-and-ai-utopia-or-dystopia-ii.html

Aug 31 – In my first post on Robots and AI, I dealt with the impact of these new technologies on future employment and productivity. I raised the contradiction that develops within the capitalist mode of production between increased productivity achieved through new technology and falling profitability.



In this second part, I want to consider the impact of robots and AI seen through the prism of Marx's law of value under capitalism. There are two key assumptions that Marx makes in order to explain the laws of motion under capitalism: 1) that only human labour creates value and 2) over time, investment by capitalists in technology and means of production will outstrip investment in human labour power – to use Marx's terminology, there will be a rise in the organic composition of capital over time.

There is no space here to provide the empirical evidence for the latter. But you can find it here (crisis and the law for BOOK1-1). Marx explained in detail in Capital that a rising organic composition of capital is one of the key features in capitalist accumulation. Investment under capitalism takes place for profit only, not to raise output or productivity as such. If profit cannot be sufficiently raised through more labour hours (i.e. more workers and longer hours) or by intensifying efforts (speed and efficiency – time and motion), then the productivity of labour

(more value per labour hour) can only be increased by better technology. So, in Marxist terms, the organic composition of capital (the amount of machinery and plant relative to the number of workers) will rise secularly. Workers can fight to keep as much of the new value that they have created as part of their 'compensation' but capitalism will only invest for growth if that wage share does not rise so much that it causes profitability to decline. So capitalist accumulation implies a falling share to labour over time, or what Marx would call a rising rate of exploitation (or surplus value).

The 'capital-bias' of technology is something continually ignored by mainstream economics. But as Branco Milanovic has pointed out,even mainstream economic theory could encompass this secular process under capitalist accumulation. As Milanovic puts it: *"In Marx, the assumption is that more capital intensive processes are always more productive. So capitalists just tend to pile more and more capital and replace labor….. This in Marxist framework means that there are fewer and fewer workers who obviously produce less (absolute) surplus value and this smaller surplus value over an increased mass of capital means that the rate of profit goes down. …..*

"The result is identical if we set this Marxist process in a neoclassical framework and assume that the elasticity of substitution is less than 1. Then, simply, r shoots down in every successive round of capital-intensive investments until it practically reaches zero. As Marx writes, every individual capitalist has an interest to invest in more capital-intensive processes in order to undersell other capitalists, but when they all do that, the rate of profits decreases for all. They thus work ultimately to drive themselves "out of business" (more exactly they drive themselves to a zero rate of profit).

Milanovic then considers the robot technology: *"Net income, in Marxist equilibrium, will be low because only labor produces "new value" and since very few workers will be employed, "new value" will be low (regardless of how high capitalists try to drive the rate of surplus value). To visualize Marxist equilibrium, imagine thousands of robots working in a big factory with only one worker checking them out, and with the useful life of robots being one year so that you keep on replacing robots continuously and thus run enormous depreciation and reinvestment costs every year. The composition of GDP would be very interesting. If total GDP is 100, we could have consumption=5, net investment=5 and depreciation=90. You would live in a country with GDP per capita of $500,000 but $450,000 of that would be depreciation."*

This poses the key contradiction of capitalist production: rising productivity leads to falling profitability, which periodically stops production and productivity growth. But what does this all mean if we enter the extreme (science fiction?) future where robotic technology and AI leads to robots making robots AND robots extracting raw materials and making everything AND carrying out all personal and public services so that human labour is no longer required for ANY task of production at all?

Let's imagine a totally automated process where no human existed in the production. Surely, value has been added by the conversion of raw materials into goods without humans? Surely, that refutes Marx's claim that only human labour can create value?

But this confuses the dual nature of value under capitalism: use value and exchange value. There is use value (things and services that people need); and exchange value (the value measured in labour time and appropriated from human labour by the owners of capital and realised by sale on the market). In every commodity under the capitalist mode of production, there is both use value and exchange value. You can't have one without the other under capitalism. But the latter rules the capitalist investment and production process, not the former.

Value (as defined) is specific to capitalism. Sure, living labour can create things and do services (use values). But value is the substance of the capitalist mode of producing things. Capital (the owners) controls the means of production created by labour and will only put them to use in order to appropriate value created by labour. Capital does not create value itself.

But in our hypothetical all-encompassing robot/AI world, productivity (of use values) would tend to infinity while profitability (surplus value to capital value)

would tend to zero. Human labour would no longer be employed and exploited by Capital (owners). Instead, robots would do all. This is no longer capitalism. I think the analogy is more with a slave economy as in ancient Rome.

In ancient Rome, over hundreds of years, the

formerly predominantly small-holding peasant economy was replaced by slaves in mining, farming and all sorts of other tasks. This happened because the booty of the successful wars that the Roman republic and empire conducted included a mass supply of slave labour. The cost to the slave owners of these slaves was incredibly cheap (to begin with) compared with employing free labour. The slave owners drove the farmers off their land through of a combination of debt demands, requisition in wars and sheer violence. The former peasants and their families were forced into slavery themselves or into the cities, where they scraped a living with menial tasks and skills or begged. The class struggle did not end. The struggle was between the slave-owning aristocrats and the slaves and between the aristocrats and the atomised plebs in the cities.

A modern science fiction can be found the recent Elysium movie. In this movie, the owners of the robots and modern technology have built themselves a complete space planet separate from the earth. There they live a life of luxury off the things and services provided by robots and defend their separated lives with their robot armies. The rest of the human race lives on earth in a dire state of poverty, disease and misery – an immiseration of the working class who no longer work for a living.

In the Elysium world, the question would remain: who owns the means of production? In the completely automated planet, how would the goods and services produced by the robots be distributed in order to be consumed? That would depend on who owns the robots, the

means of production. Suppose there are 100 lucky guys on the robot-run planet. One of them may own the best robots and so appropriate the whole product. Why should he share it with the other 99? They will be sent back to the Earth. Or they might not like it and will fight for the appropriation of some of the robots. And so, as Marx put it once, the whole shit begins again, but with a difference.

All will depend on how humanity would get to a completely automated society. On the basis of a socialist revolution and common ownership, the distribution of the output produced by the robots can be controlled and distributed to each according to his/her needs. If society operates on the basis of a continuation of the private ownership of the robots, then the class struggle for the control of the surplus continues.

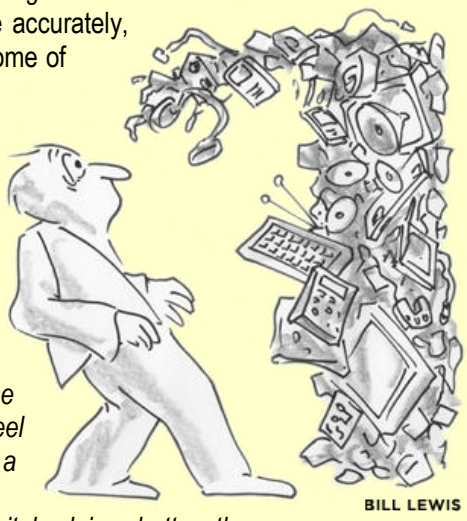
The question often posed at this point is: who are the owners of the robots and their products and services going to sell to make a profit? If workers are not working and receiving no income, then surely there is massive overproduction and underconsumption? So, in the last analysis, it is the underconsumption of the masses that brings capitalism down?

Again, I think this is a misunderstanding. Such a robot economy is not capitalist any more; it is more like a slave economy. The owners of the means of production (robots) now have a super-abundant economy of things and services at zero cost (robots making robots making robots). The owners can just consume. They don't need to make 'a profit', just as the aristocrat slave owners in Rome just consumed and did not run businesses to make a profit. This does not deliver an overproduction crisis in the capitalist sense (relative to profit) nor 'underconsumption'

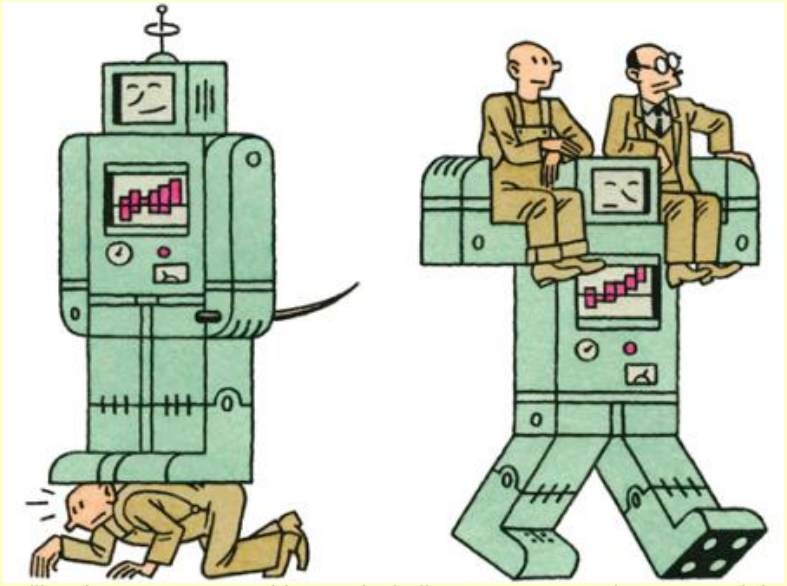
(lack of purchasing power or effective demand for goods on a market), except in the physical sense of poverty.

Mainstream economics continues to see the rise of the robots under capitalism as creating a crisis of underconsumption. As Jeffrey Sachsput it: *"Where I see the problem on a generalised level for society as a whole is if humans are made redundant on an industrial scale (47% quoted in US) then where's the market for the goods?"* Or as Martin Ford puts it: *"there is no way to envision how the private sector can solve this problem. There is simply no real alternative except for the government to provide some type of income mechanism for consumers"*. Ford does not propose socialism, of course, but merely a mechanism to redirect lost wages back to 'consumers', but such a scheme would threaten private property and profit.

A robotic economy could mean a super-abundant world for all (post-capitalism as Paul Mason suggests); or it could mean Elysium. FT columnist, Martin Wolf put it this way: *"The rise of intelligent machines is a moment in history. It will change many things, including our economy. But their potential is clear: they will make it possible for human beings to live far better lives. Whether they end up doing so depends on how the gains are produced and distributed. It is possible that the ultimate result will be a tiny minority of huge winners and a vast number of losers. But such an outcome would be a choice not a destiny. A form of techno-feudalism is unnecessary. Above all, technology itself does not dictate the outcomes. Economic and political institutions do. If the ones we have do not give the results we want, we must change them"*. It's a social 'choice' or more accurately, it depends of the outcome of the class struggle under capitalism.



John Lanchester is much more to the point: *"It's also worth noting what isn't being said about this robotified future. The scenario we're given – the one being made to feel inevitable – is of a hyper-capitalist dystopia. There's capital, doing better than ever; the robots, doing all the work; and the great mass of humanity, doing not much, but having fun playing with its gadgets…There is a possible alternative, however, in which ownership and control of robots is disconnected from capital in its current form. The robots liberate most of humanity from work, and everybody benefits from the proceeds: we don't have to work in factories or go down mines or clean toilets or drive long-distance lorries, but we can choreograph and weave and garden and tell stories and invent things and set about creating a new universe of wants. This would be the world of unlimited wants described by economics, but with a distinction between the wants satisfied by humans and the work done by our machines. It seems to me that the only way that world would work is with alternative forms of ownership. The reason, the only reason, for thinking this better world is possible is that the dystopian future of capitalism-plus-robots may prove just too grim to be politically viable. This alternative future would be the kind of world dreamed of by William Morris, full*



of humans engaged in meaningful and sanely remunerated labour. Except with added robots. It says a lot about the current moment that as we stand facing a future which might resemble either a hyper-capitalist dystopia or a socialist paradise, the second option doesn't get a mention."

But let's come back to the here and now. If the whole world of technology, consumer products and services could reproduce itself without living labour going to work and could do so through robots, then things and services would be produced, but the creation of value (in particular, profit or surplus value) would not. As Martin Ford puts it: *the more machines begin to run themselves, the value that the average worker adds begins to decline."* So accumulation under capitalism would cease well before robots took over fully, because profitability would disappear under the weight of 'capital-bias'.

The most important law of motion under capitalism, as Marx called it, would be in operation, namely the tendency for the rate of profit to fall. As 'capital-biased' technology increases, the organic composition of capital would also rise and thus labour would eventually create insufficient value to sustain profitability (i.e. surplus value relative to all costs of capital). We would never get to a robotic society; we would never get to a workless society – not under capitalism. Crises and social explosions would intervene well before that.

And that is the key point. Not so fast on the robot economy. In the next and final post on the issue, I shall consider the reality of the robot/AI future under capitalism.

Europeans concerned over thriving trade in fake, stolen Syrian papers

Source: http://www.homelandsecuritynewswire.com/dr20150909-europeans-concerned-over-thriving-trade-in-fake-stolen-syrian-papers

Refugees, mostly from Syria, wait for a bus after disembarking from a ferry at the port of Piraeus near Athens. Photograph: Yannis Kolesidis/EPA

Sept 09 – The EU countries trying to formulate a cohesive policy to deal with the hundreds of thousands of refugees trying to enter the EU zone are now facing a new problem: The burgeoning trade in stolen Syrian identity documents.

Most European countries are yet to agree to accept more than a

token number of Syrian refugees, but Germany and Sweden have made it known that while the EU is grappling with the issue, the asylum system in both countries would offer preferential treatment for Syrians. This preference has made Syrian passports into a must-have document for non-Syrian immigrants who would otherwise not be likely to qualify as refugees.

Fabrice Leggeri, the head of the European border agency Frontex, said his agency found evidence that Arabs from outside Syria were buying counterfeit Syrian passports. He told a French television channel that the appeal to buyers lay in how "they know Syrians get the right to asylum in all the member states of the European Union."

The *Guardian* reports that this **trade in forged documents is a major concern not just Frontex, but to Syrian refugees themselves, who are now worried that proliferation of forged Syrian documents would undermine their own chances of asylum, or slow down the application process.**

Hashem Alsouki, whose application for asylum in Sweden was profiled by the *Guardian* earlier this year, told the paper: "The situation with the passports is very worrying, and it might be the reason why my application for asylum is taking a long time. The officials have to spend more time working out if someone is a genuinely a Syrian citizen."

There is evidence that more and more Syrians are also using fake identification and forged papers to make their passage through Europe easier.

Refugees who leave Syria in an effort to get into the EU zone must get to Greece first. There are, however, two ways out of Greece. The more arduous track is the long hike through northern Greece and the Balkans into Hungary, and from there to Austria, Germany, and other destinations in northern Europe.

The second, and more expensive, way is to take a plane or a commercial ship – but this requires a national ID card and a passport, and those who do not have these papers must use fake documents.

European security and immigration authorities say that more and more Syrian are "borrowing" papers from relatives or friends who are of similar age and appearance. A Syrian might thus use what is now called a "ghost passport" to fly from Greece to an EU country, and then mail the passport back to its rightful owner after being granted asylum.

Other passports and IDs are stolen.

The *Guardian* Athens reporter found a dealer nicknamed Abu Karem offers all kinds of European passports to Syrians. Some are brand new, printed in Bulgaria, and they cost a few hundred euros, but these are almost worthless.

The much more expensive ones — costing up to €5,000 each — are real but stolen passports which come with stamps. The dealer will also replace the picture in the passport with that of the buyer.

Some dealers sell "packages" which include not only the fake documents, but also plane tickets.

New personality profiling technique helps identify potential school shooters

Source: http://aabgu.org/identifying-school-shooters/

Sept 09 – **Ben-Gurion University of the Negev (BGU) researchers have developed a personality profiling technique, featured in *Frontiers in Forensic Psychiatry*, which automates the identification of potential school shooters by analyzing personality traits that appear in their writings.**

"School shooters present a challenge to both forensic psychiatry and law enforcement agencies," explains Prof. Yair Neuman, a member of the BGU Homeland Security Institute. "There is currently no clear consensus or clinical diagnosis that can be used for screening shooters. Finding a single shooter in a large population, as well as a lack of clinical diagnosis before an occurrence adds to the complexity."

A release by the American Associates, Ben-Gurion University of the Negev (AABGU) notes that the study details the text-based computational personality-profiling

tool, which uses "vector semantics." This involves constructing a number of vectors representing personality dimensions and disorders, which are analyzed automatically by computer to measure the similarity with texts written by the human subject.

"For example, an investigator may want to measure the extent in which narcissism is manifested in a text," Neuman explains. "First, we define a vector of words representing this personality such as 'arrogant,' 'manipulative,' 'egocentric,' and 'insensitive.' The computer measures the distance between the vector of words comprising our target text and those representing narcissism in a high-dimensional semantic space. The closer the vectors appear, the higher the writer's narcissistic ranking."

In this study, BGU researchers selected writings by six shooters involved in a number of high-profile scenarios worldwide, including the Virginia Tech Massacre in 2007. Then they analyzed and compared these with writings by 6,000 bloggers and tasked the computer to identify the shooters.

Although pinpointing a single person was not the goal, the tool was able to significantly reduce the pool of suspects to only three percent of the original sample, which included the writings of all six shooters. This shows that using intelligent technology can significantly reduce the effort needed to identify shooters or even solo terrorists.

The methodology is automatic, which also enables screening a massive number of texts in a short time, which could aid in detection.

"While ethical considerations are inevitable, we can definitely imagine a situation in which parents give the school permission to scan their teenagers' social media pages under certain limitations. In this context, using our automatic screening procedure, a qualified psychiatrist or psychologist who is trained may automatically get red flag warnings for students whose texts express a high level of potential danger," explains Neuman.

"The proposed methodology does not pretend to solve the enormous difficulties in profiling and identifying school shooters, but modestly adds another tool to the tool kit of forensic psychiatry and law enforcement agencies," Neuman says. "We believe our methodology can gain more validity with the ranking/prioritization process of suspects, similar to the automatic identification of sexual predators created to prioritize an investigation."

— Read more in Yair Neuman et al., "Profiling school shooters: automatic text-based analysis," Frontiers in Forensic Psychiatry *6 (3 June 2015).*

Don't overstate risk of terrorism among refugees, experts say

By Ian MacLeod

Source: http://ottawacitizen.com/news/politics/dont-overstate-risk-of-terrorism-among-refugees-experts-say

Sept 10 – **The risk that some Islamist terrorists could infiltrate Canada posing as Syrian refugees is a valid concern but shouldn't be overblown, say national security specialists.**

"It is possible that among the stream of wretched refugees desperately looking for a way, that there might be some who aren't exactly the people we want to bring in," said Reg Whitaker, a security and intelligence expert and one-time advisor to the commissions of inquiry into the Air India bombing and Maher Arar affair.

Whitaker was reacting to comments Wednesday by Conservative Leader Stephen Harper about how national security will dictate the pace of Canada's response to the Syrian refugee crisis.

"When we are dealing with people that are from, in many cases, a terrorist war zone, we are going to make sure that we screen people appropriately and the security of this country is fully protected," Harper said at a campaign stop in Welland, Ont.

"We cannot open the floodgates and airlift tens of thousands of refugees out of a terrorist war zone without proper process. That is too great a risk for Canada," he added during a question-and-answer session.

Harper's remarks continue a security narrative the

Conservatives launched after the fatal terror attacks by ISIL sympathizers in Ottawa and Saint-Jean-sur-Richelieu almost a year ago. National security is a key plank in the party's election platform.

But the government should not be presenting refugee resettlement here as an either/or option with anti-terrorism efforts, says Scott Watson, an associate professor of international relations at the University of Victoria.

"I think it's possible to do a large-scale operation of assisting refugees that (also) has a thorough screening component for security reasons, if there was enough political will to do so. I think both can be done," he said.

"The vast majority of the people have no interest in contributing to further violence. There could be a couple of people who are sympathetic to ISIL coming in, but if there's proper security screening and proper integration once refugees are brought into the country, I don't think it's something we need to be concerned about."

Besides, "there's much better ways for them (ISIL) to do what they want to do than to use refugees as the means of doing it," said Watson.

He and Whitaker have done extensive research on the rise of national security fears that have accompanied concentrated waves of immigration to Canada. Harper's framing of the Syrian refugee crisis in security terms is similar to concerns, ultimately unfounded, that communist infiltrators would accompany the arrival of Hungarian refugees to Canada in 1956, or with the Cambodian and Vietnamese boat people in the late 1970s.

Whitaker concludes many refugee groups now tend to be seen as importers of external political conflicts to the West.

Canadian Security Intelligence Service (CSIS) officers overseas are responsible for much of the security vetting of refugees and immigrants. Many refugees understandably have no official identity documents. But, "you can't go back to the Syrians or an area that's no longer under Iraqi government control and say, 'by the way, is Mohammed a resident of Erbil?'" said Ray Boisvert, a former CSIS assistant director of intelligence.

"You try to do your best to interview them and get a decent sense of their background and see if you can poke any holes in it."

Boisvert, too, says the current humanitarian need outweighs possible risks from terrorism. "It is a very manageable risk if you're conscious that there is a risk and that you do not undermine the efforts of CSIS assets to do their job in the screening process."

Said Whitaker: "When you think about these people crossing the Mediterranean in rickety and unseaworthy boats, some of them drowning and many of them being asphyxiated in trucks, and the mobs that are trying to make their way from Greece and Turkey to Germany, and the idea that somehow through all that you're going to get people who are carefully planted, who are then immediately going to get accepted into Canada and start wrecking havoc is just plain, downright silly."

Ian MacLeod is a Parliamentary reporter for the Ottawa Citizen covering public security, national security and the Supreme Court of Canada.

EDITOR'S COMMENT: Sure "do not overstate" and then wait to see if that was a right decision or not! But also read the next article.

Refugees are prime candidates to become lone wolf terrorists, says SAS hero

Source: http://www.express.co.uk/news/uk/603862/Islamic-State-Refugees-lone-wolf-terrorists-SAS-hero-chris-ryan

That's the view of Chris Ryan, an SAS hero who made an extraordinary escape from Iraq during the first Gulf War. Over the last 20 years he has extensively researched war and terrorism for a series of novels.

He has previously forewarned of the dangers of destabilising countries such as Syria and Iraq, which is where Islamic State is rapidly growing.

Now he believes an imminent threat for Britain comes in the shape of migrants heading over from those disaster zones, both in the form of highly-trained ISIS operatives intent on wreaking havoc and those radicalised once they are here.

Speaking to Express.co.uk today, Ryan said: "It's critical there's some way to register refugees coming here and we must having a list of who's in the country because there's a risk of undesirables infiltrating Britain, trained in making explosives. In effect, they can wreck huge devastation.

"But what's even more likely are lone wolves.

"Some people who will come over here will find this world isn't as rosy as they hoped.

"They will find it difficult to live in a new culture and will be open to hate preachers who will radicalise them, telling them how they're being let down."

Ryan, whose latest novel, Hellfire, focuses on a terror plot born out of the burgeoning relationship between ISIS and feared Boko Haram in Nigeria, believes the vast majority arriving coming in the migrant crisis have honest intentionsthe migrant crisis but the situation is fraught.

The SAS man, who was part of the Bravo Two Zero patrol which was catastrophically compromised in 1991, said the focus must be on those who could cause problems in Britain, with the burden resting on the shoulders of the intelligence agencies.

He said: "We're totally reliant on security services with regards getting information.

"There's a great distrust in some of the mosques where they preach hatred. It's difficult to get to.

"The security services are stretched, but they are the best hope we've got.

"It's a really difficult situation.

"They are coming over to Europe in their thousands. It's disgraceful what's happening to those poor families and what's driven then to make that journey.

"A couple of weeks ago people were thinking they just want to come here to get benefits and get a house but now we've doctors, businessmen, lawyers, real professionals fleeing the Middle East to try to get to a safe haven.

"It's a real mess."

Emirates defends its response to Syria's refugee crisis

Source: http://www.terrorismwatch.org/2015/09/emirates-defends-its-response-to-syria.html

Sept 11 – **The United Arab Emirates on Wednesday defended its response to the Syrian refugee crisis in the face of criticism that the country and other oil-rich Gulf States should be doing more to address the issue.**

In a statement provided to the Associated Press, the Emirati government said it has extended residency permits to more than 100,000 Syrians who have entered the country since 2011, and that more than 242,000 Syrian nationals currently live in the country. It did not provide details on the terms of the visa extensions.

"The UAE has made it one of its foreign policy priorities to address this issue in a sustainable and humane fashion together with its regional and international partners," the statement said.

The Emirates is a major destination for guest workers and foreign businesspeople from around the world, including the Middle East. Residency visas are typically tied to an employing sponsor or a resident family member, and do not allow for an indefinite stay in the country or an opportunity to acquire Emirati citizenship.

More than 9 million people live in the Emirates, with foreigners outnumbering citizens more than four to one.

The seven-state federation, which includes the Mideast commercial hub of Dubai and the oil-rich capital of Abu Dhabi, is the Arab world's second-largest economy. It is one of the most prominent Arab members of the US-led aerial campaign against the Islamic State group in Iraq and Syria.

In addition to the visa extensions, the Emirates said it has provided more than $530 million in humanitarian aid and development assistance since 2012 in response to the Syrian crisis.

Part of that aid goes to fund the smallest of three refugee camps in Jordan, which is sheltering more

than half a million Syrian refugees. The UAE-funded camp, known as **Marajeeb al-Fhood**, houses more than 4,000 refugees.

Europe's migrant crisis: Defense contractors are poised to win big

Source: http://fortune.com/2015/09/10/europe-migrant-crisis-defense-contractors/

As hundreds of thousands of refugees clamor to get in, mounting anxiety over Europe's porous borders has generated a lucrative opportunity for companies clever at keeping people out.

The chief beneficiary may be Europe's defense industry, which in recent years has suffered steep budget cuts at home and stiff competition abroad.

"The European arms industry has faced significant problems in the declining demand for defense projects," said Pieter Wezeman, a defense industry expert at the

Stockholm International Peace Research Institute (SIPRI).

From 2005 to 2014, defense budgets in Western and Central Europe fell by 8.3% in real terms, according to SIPRI's analysis.

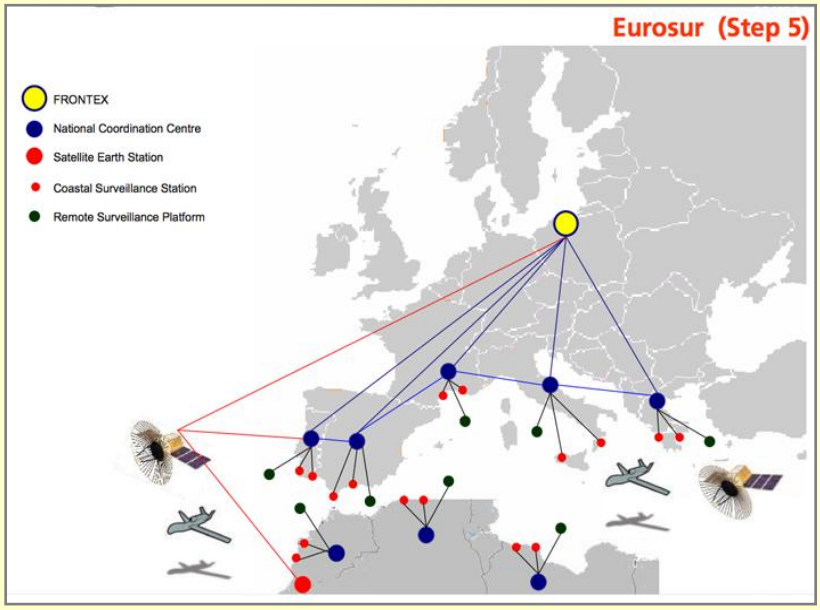
The current refugee crisis may offer a chance for defense firms to capitalize on an expanding market in border control and surveillance, according to Wezeman. Military technology – like satellites, sensors, and drones – is being repurposed to meet rising demands for border security.

The timing couldn't be better. In its 2013 annual report, Italy's Finmeccanica, a leading defense contractor, said that rising demand for border security and surveillance has been offsetting losses in traditional military orders.

According to market analysis group Frost & Sullivan, the global border and maritime security industry was worth $29.3 billion in 2012. By 2022, that market is estimated to reach $56.5 billion.

Which companies stand to benefit from this growth? According to SIPRI's most recent global ranking, the largest European defense players are Finmeccanica, the UK's BAE Systems, France's Thales, and European multinational Airbus, formerly EADS.

Border control is already a core piece of these companies' export portfolios. These firms have secured contracts for high-profile and high-tech border security projects in the Middle East and North Africa – in Libya and Saudi Arabia, for instance – worth billions of euros. But the present crisis provides an opening for defense firms to expand profits in their own backyard.



It is difficult to track border security contracts since much of the technology is dual purpose. Are maritime sensors on Italian naval vessels a border control technology, or a military one? How about drones, or space-based surveillance?

While the refugee crisis has focused new attention on how Europe handles its borders, European Union research and development (R&D) funding for border control technology, funneled through European defense contractors, is nothing new. For example, **from 2002 to 2013, Airbus, Finmeccanica, and Thales—largely through subsidiaries—have collected the lion's share of 225 million euros to thicken the defenses of "Fortress Europe" through the development of drones, olfactory sensors, and border patrol robots.**

Europe's big defense companies have assumed key roles on projects contributing to EUROSUR, an EU-funded surveillance system that uses drones, reconnaissance aircraft, and satellites to monitor Europe's external borders.

"Perseus," which integrates new and old sensor technologies on Europe's seas and borders, is worth 43.6 million euros and includes a roster of defense partners, including Airbus, Saab, and Boeing. And **"Seabilla,"** a maritime surveillance project covering Europe's Mediterranean, English Channel and Atlantic coasts, has cost 15.5 million euros. The project is coordinated by Selex, a Finmeccanica subsidiary, and includes Thales and BAE.

Implementing new technologies, and integrating them into a pan-European surveillance capability, will likely continue to boost the defense industry's bottom line. The European Commission estimates **EUROSUR will cost 244 million euros between 2014 and 2020, though critics expect it will cost far more.**

The prominent role of defense contractors in supplying border services has prompted concerns about accountability and the rise of a "security-

industrial" complex. Security working groups, which steer EU policy, are packed with industry representatives, according to the Migrants Files, a consortium of 15 European journalists. At the same time, these working groups lack adequate representation from the International Organization for Migration or UNHCR, the United Nations' refugee agency.

According to the EU Observer, the security industry's Belgium-based trade group EOS has played a significant role in EU border security legislation. Policies create industries, say the critics, which may in turn influence policy.

The **drone industry** is one example, some argue, of how commercial motives influence policy decisions. Ilka Laitinen, executive director of Frontex—the EU's border control agency—told the EU Observer that drones provide a cost-effective way to monitor Europe's borders and conduct search-and-rescue missions in the Mediterranean, saving refugees in distress. Yet it is not only the refugees who are in distress: The push for greater investment in aerial surveillance parallels commercial anxieties that Europe lags behind American and Israeli competitors in an emerging drone industry that could be worth billions. According to a 2014 market assessment by the Teal Group, global drone expenditures are expected to nearly double from $6.4 billion to $11.5 billion over the next decade.

In recent days, border fortification has intensified. Perhaps most dramatically, Hungary, which first pierced the iron curtain in 1989 by opening its border to Austria, is building a 109-mile stretch of razor wire intended to keep refugees from slipping in from Serbia. Critics say such efforts are futile and potentially dangerous. They certainly don't address the conflicts and misery that led many to leave home and chance the Aegean in inflatable rafts, or pack into smugglers' ships to cross the Mediterranean, which Human Rights Watch has called the "world's deadliest migration route."

Strict border controls simply raises the prices refugees have to pay smugglers, as well as the risks of getting in. This explains, in part, some of 2015's calamities: the 800 migrants and refugees who drowned off the coast of Italy's Lampedusa in April, and last month's discovery of 71 people who had suffocated in the back of a lorry abandoned near the Austrian border.

"Lots of money goes into border controls, but this does not address the causes of migration," said Hein de Haas, a professor of migration studies at the University of Amsterdam and former director of the International Migration Institute at Oxford University. "Instead, it helps two groups," he said. "The smugglers and the migration control industry, while the suffering and border deaths among migrants and refugees increase."

Still, the money spigot is unlikely to be switched off any time soon, creating commercial opportunities but also, some fret, presenting a threat to broader European aspirations. The current crisis undermines the idea of a borderless Europe, articulated under the Schengen Agreement of 1985, according to analysis from Stratfor, a global intelligence firm.

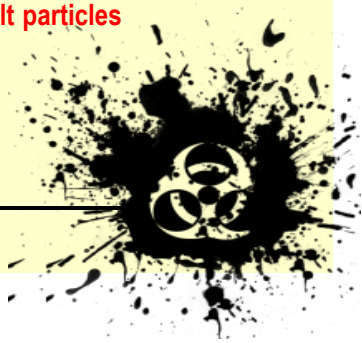
If walls continue popping up along Europe's external borders, it may serve only to intensify the present dynamics. Between the smugglers trying to find a way in, and the private firms tasked with keeping them out, the ones likely to remain caught in the middle are the refugees.

Innovative method filters seawater in minutes

Source: http://www.homelandsecuritynewswire.com/dr20150911-innovative-method-filters-seawater-in-minutes

Sept 11 – Researchers at Alexandria University in Egypt have unveiled a cost-effective desalination technology which can filter highly salty water in minutes.

***Scidev* reports that the technology is based on membranes containing cellulose acetate powder, produced in Egypt. The powder, in combination with other components, binds the salt particles as they pass through, making the technique useful for desalinating seawater.**



"The membrane we fabricated can easily be made in any laboratory using cheap ingredients, which makes it an excellent option for developing countries," says Ahmed El-Shafei, an associate professor of agricultural and biosystems engineering in Alexandria University, and an author of the study.

The technology uses pervaporation, a technique by which the water is first filtered through the membrane to remove larger particles and then heated until it vaporizes. The vapor is then condensed to get rid of small impurities, and clean water is collected.

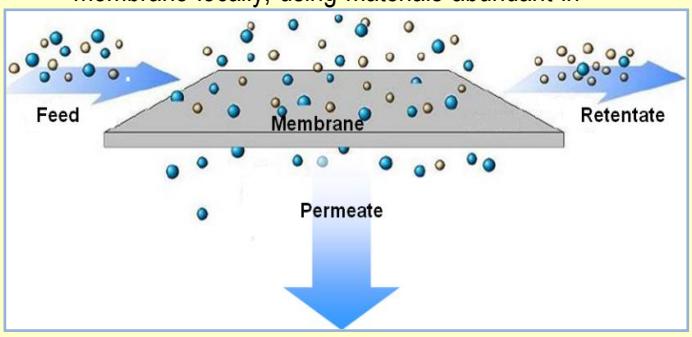
According to the research paper, published in *Water Science and Technology* last month, this method can be used to desalinate water which contains different types of contamination, such as salt, sewage and dirt. This kind of water is difficult to clean quickly using existing procedures.

The membrane technology in combination with vaporization can be applied in remote settings, as it requires only the membranes for the filtering process, and fire to vaporize the filtered water, the researchers say.

"Using pervaporation eliminates the need for electricity that is used in classic desalination processes, thus cutting costs significantly," says El-Shafei.

Pervaporation is used to separate organic liquids, like alcohols, and is one of the more common systems used in sewage treatment to separate water from organic solvents. The technology has been around since the mid-1990s, Helmy El-Zanfaly, a professor of water contamination at Egypt's National Research Center.

But, he says, "What is new is making the membrane locally, using materials abundant in Egypt and developing countries." El-Zanfaly adds that existing pervaporation membranes are fabricated using complicated procedures, making them unsuitable for cheap production.



"The technology implemented in the study is much better than reverse osmosis, the technology currently used in Egypt and most of the countries in the Middle East and North Africa," El-Zanfaly says. "It can effectively desalinate water with high concentration of salt like that of the Red Sea, where desalination costs more and yields less."

The technology can be adapted for commercial use by fabricating larger sheets of the membrane and cutting these into suitable swathes, according to El-Shafei. **The next step for the team is to establish a small desalination unit as a pilot project for the technology.**

— Read more in Mona Naim et al., "Desalination of simulated seawater by purge-air pervaporation using an innovative fabricated membrane," Water Science & Technology 72, no. 5 (2015): 785–93.

New military radio uses soldiers' bones to send messages

Source: http://www.foxnews.com/tech/2015/09/10/new-military-radio-uses-soldiers-bones-to-send-messages/

A new radio technology lets war fighters talk to each other by harnessing their bones to transmit and listen to messages.

The technology leverages the human body's natural ability to transmit sound through bone. It takes the bone-transmitted messages and then delivers them directly to the inner ear through the warfighter's helmet.

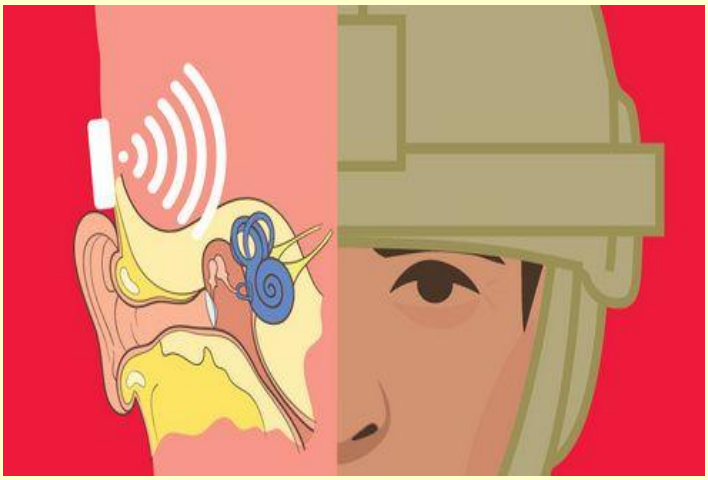
War fighters can both listen to messages and send messages this way – and the tech is the mere weight and size of a small coin.

Made by BAE Systems, the prototype will be on show at the Defence and Security Equipment International show in London next week. The biennial four-day event is the world's biggest defense and

security trade show. More than 30,000 visitors from 121 countries walked the floors at DSEI in 2013.

Communication 2.0

Radios are an essential tool that forces use to communicate with each other and understand the environment where they are working. In the



battle space environment, radios need to be effective amid loud noises from explosions and gunfire – war fighters also need to defend their hearing against the noise volume by wearing sound protection.

With this cutting-edge bone conduction tech, war fighters still send and receive messages while wearing sound protection for their ears.

By looking at the bone conduction used in commercial hearing aids and headphones, BAE was able to reduce both the time and cost to develop its military radio technology.

The company's military variant of bone conduction tech is lightweight and compact. BAE Systems says that the prototype's transducer is about the size of a nickel.

How does it work?

The human body can transmit sound through its bones. Sound waves also travel through the ear canal.

In bone conduction, sound skips the ear drum. Instead, the tech converts sound waves into vibrations that are sent through the skull bones directly to the place deep inside the ear called the cochlea. At this site, the sound is translated into nerve impulses for the brain to understand.

Google Glass is a commercial example of bone conduction, transmitting information to the user through a transducer that sits next to the ear.

Evaluating new types of tourniquets by the Israeli Naval special warfare unit

By Eitan Heldenberg[1], **Shahar Aharony**[2], **Tamir Wolf**[2] and **Tali Vishne**[3]

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Disaster and Military Medicine 2015, **1**:1

Source: http://www.disastermilitarymedicine.com/content/1/1/1

Extremity injuries, which accounts for 20% of all battlefield injuries, result in 7-9% of deaths during military activity. Silicone tourniquets were used, by the Israeli Defense Force (IDF) soldiers, for upper

extremity and calf injuries, while thigh injuries were treated by an improvised "Russian" tourniquet (IRT). This is the first study, performed in the IDF, comparing the IRT with Combat Application Tourniquets (CAT) and Special Operations Force Tactical Tourniquets (SOFTT). 23 operators from the **Israeli Naval Unit (Shayetet 13)** were divided into two groups according to their medical training (11 operators trained as first-responders; 12 operators as medics). Repetitive applications of the three tourniquets over the thigh and upper arm, and self-application of the CAT and SOFTT over the dominant extremity were performed using dry and wet tourniquets (828 individual placements) with efficacy recorded. Cessation of distal arterial flow (palpation; Doppler ultrasound) confirmed

success, while failure was considered in the advent of arterial flow or tourniquet instability. Satisfaction questionnaires were filled by the operators.

CAT

SOFTT

Results

CAT and SOFTT were found to be superior to the IRT, in occluding arterial blood flow to the extremities (22%, 23% and 38%, respectively, failure rate). The application was quicker for the CAT and SOFTT as compared to the IRT (18, 26, 52 seconds, respectively). Wet tourniquets neither prolonged application nor did they increase failure rates. Similarly, medics didn't have any advantage over non-medic operators. No findings indicated superiority of CAT and SOFTT over one another, despite operators' preference of CAT.

Conclusions

CAT and SOFTT offer an effective alternative to the IRT in stopping blood flow to extremities. No difference was observed between medics and non-medic operators. Thus, the CAT was elected as the preferred tourniquet by our unit and it is being used by all the operators.

▶ **Read the full paper at source's URL.**

Middle East Provocations and Predictions

By Daniel Pipes

Source: http://www.meforum.org/5486/middle-east-provocations-predictions

The Middle East stands out as the world's most volatile, combustible, and troubled region; not coincidentally, it also inspires the most intense policy debates – think of the Arab-Israeli conflict or the Iran deal. The following *tour d'horizon* offers interpretations and speculations on Iran, ISIS, Syria-Iraq, the Kurds, Turkey, Saudi Arabia, Egypt, Israel, and Islamism, then concludes with some thoughts on policy choices. My one-sentence conclusion: some good news lies under the onslaught of misunderstandings, mistakes, and misery.

Iran

Iran is Topic No. 1 these days, especially since the nuclear deal the six great powers reached with its rulers in Vienna on July 14. The "Joint Comprehensive Plan of Action" seeks to bring Tehran in from the cold, ending decades of hostility and inducing Iran to become a more normal state. In itself, this is an entirely worthy endeavor.

The problem lies in the execution, which has been execrable, rewarding an aggressive government with legitimacy and additional funding, not requiring serious safeguards on its nuclear arms program, and permitting that program in about a decade. The annals of diplomacy have never witnessed a comparable capitulation by great powers to an isolated, weak state.

The Iranian leadership has an apocalyptic mindset and preoccupation with the end of days that does not apply to the

North Koreans, Stalin, Mao, the Pakistanis or anyone else. Supreme Leader Ali Khamene'i et al. have reason to use these weapons for reasons outside of the normal military concerns – to bring on the end of the world. This makes it especially urgent to stop them.

Economic sanctions, however, amount to a sideshow, even a distraction. The Iranian government compares to the North Korean in its absolute devotion to building these weapons and its readiness to do whatever it takes, whether mass starvation or some other calamity, to achieve them. Therefore, no matter how severely applied, the sanctions only make life more difficult for the Iranian leadership without actually stopping the nuclear buildup.

The only way to stop the buildup is through the use of force. I hope the Israeli government – the only one left that might take action – will undertake this dangerous and thankless job. It can do so through aerial bombardment, special operations, or nuclear weapons, with option #2 both the most attractive and the most difficult.

If the Israelis do not stop the bomb, a nuclear device in the hands of the mullahs will have terrifying consequences for the Middle East and beyond, including North America, where a devastating electromagnetic pulse attack must be considered possible.

To the contrary, if the Iranians do not deploy their new weapons, it is just possible that the increased contact with the outside world and the disruption caused by inconsistent Western policies will work to undermine the regime.

ISIS

The Islamic State in Iraq and Syria (aka ISIS, ISIL, Islamic State, Daesh) is the topic that consumes the most attention other than Iran. I agree with Ron Dermer, the Israeli ambassador to Washington, that Iran is a thousand times more dangerous than ISIS. But ISIS is also a thousand times more interesting. Plus, the Obama administration finds it a useful bogeyman to justify working with Tehran.

Emerging out of almost nowhere, the group has taken Islamic nostalgia to an unimagined extreme. The Saudis, the ayatollahs, the Taliban, Boko Haram, and Shabaab each imposed its version of a medieval order. But ISIS went further, replicating as best it can a seventh-century Islamic environment, down to such specifics as public beheading and enslavement.

This effort has provoked two opposite responses among Muslims. One is favorable, as manifested by Muslims coming from Tunisia and the West, attracted moth-like to an incandescently pure vision of Islam. The other, more important, response is negative. The great majority of Muslims, not to speak of non-Muslims, are alienated by the violent and flamboyant ISIS phenomenon. In the long term, ISIS will harm the Islamist movement (the one aspiring to apply Islamic law in its entirety) and even Islam itself, as Muslims in large numbers abominate ISIS.

One thing about ISIS will likely last, however: the notion of the caliphate. The last caliph who actually gave orders ruled in the 940s. That's the 940s, not the 1940s, over a thousand years ago. The reappearance of an executive caliph after centuries of figurehead caliphs has prompted considerable excitement among Islamists. In Western terms, it's like someone reviving the Roman Empire with a piece of territory in Europe; that would get everybody's attention. I predict the caliphate will have a lasting and negative impact.

Syria, Iraq, and the Kurds

In certain circles, Syria and Iraq have come to be known as *Suraqiya*, joining their names together as the border has collapsed and they have each simultaneously been divided into three main regions: a Shiite-oriented central government, a Sunni Arab rebellion, and a Kurdish part that wants out.

This is a positive development; there's nothing sacred about the British-French Sykes-Picot agreement of 1916 that created these two polities. Quite the contrary, that accord has proven an abject failure; conjure up the names of Hafez al-Assad and Saddam Hussein to remember why. These miserable states exist for the benefit of their monstrous leaders who proceed to murder their own subjects. So, let them fracture into threes, improving matters for the locals and the outside world.

As Turkish-backed Sunni jihadis fight Iranian-backed Shi'i jihadis in Suraqiya, the West should stand back from the fighting. Neither side deserves support; this is not our fight. Indeed, these two evil forces at

each others' throats means they have less opportunity to aggress on the rest of the world. If we do wish to help, it should be directed first to the many victims of the civil war; if we want to be strategic, help the losing side (so neither side wins).

As for the massive flow of refugees from Syria: Western governments should not take in large numbers but instead pressure Saudi Arabia and other rich Middle Eastern states to offer sanctuary. Why should the Saudis be exempt from the refugee flow, especially when their country has many advantages over, say, Sweden: linguistic, cultural, and religious compatibility, as well as proximity and a similar climate.

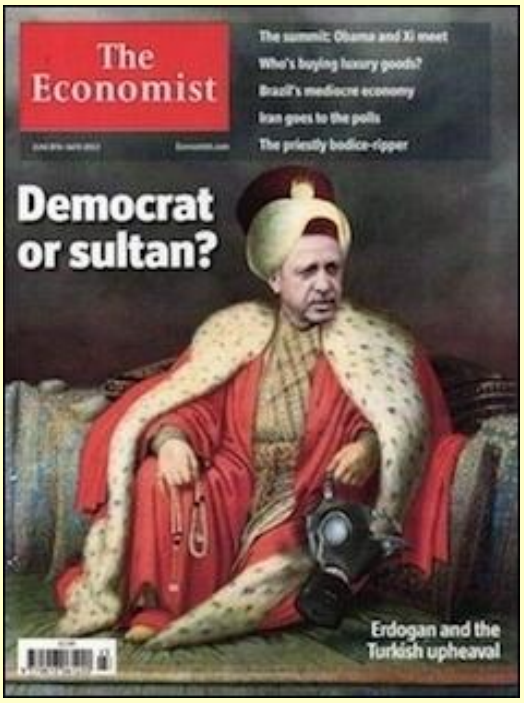
The rapid emergence of a Kurdish polity in Iraq, followed by one in Syria, as well as a new assertiveness in Turkey and rumblings in Iran are a positive sign. Kurds have proven themselves to be responsible in a way that none of their neighbors have. I say this as someone who, 25 years ago, opposed Kurdish autonomy. Let us help the Kurds who are as close to an ally as we have in the Muslim Middle East. Not just separate Kurdish units should come into existence but also a unified Kurdistan made up from parts of all four countries. That this harms the territorial integrity of those states does not present a problem, as not one of them works well as presently constituted.

Turkey

The June 2015 election turned out not so well for the Justice and Development Party (Adalet ve Kalkınma Partisi, or AKP), the party that's single-handedly been ruling Turkey since 2002. It's an Islamist party but more importantly of late, it is the party of tyranny.

Recep Tayyip Erdoğan, its dominant figure, does as he wishes, gaining undue influence over the banks, the media, the schools, the courts, law enforcement, the intelligence services, and the military. He overrides customs, rules, regulations, and even the constitution in the block-by-block building of a one-man rule. He's the Middle Eastern version of Venezuela's Hugo Chávez.

For the most part, Erdoğan has played by democratic rules, via elections and parliament, which has served him well. But the June election could spell the end of his self-restraint. Long ago, when mayor of Istanbul, he signaled that he ultimately does not accept the verdict of



elections, stating that democracy is like a bus: "You ride it until you arrive at your destination, then you step off." He has now reached that destination and appears ready to step off. He has initiated hostilities against the Kurdish PKK group as an ugly electoral tactic (to win over Turkish nationalists); he might go so far as to start a war between now and the Nov. 1 snap elections, taking advantage of a constitutional provision deferring elections in time of war.

Accordingly, the June electoral setback will not prove much of an obstacle to Erdoğan, whose path to tyranny remains open.

Erdoğan's undoing will likely not be domestic, nor will it concern a relative triviality like votes; it will be foreign and concern larger issues. Precisely because he has done so well domestically, he believes himself a master politician on the global stage and pursues a foreign policy as aggressive as his domestic one. But, after some initial successes of the "Zero problems with neighbors" policy, Turkey's international standing lies in tatters. Ankara has bad relations or major problems with nearly every neighbor: Russia, Azerbaijan, Iran, Syria, Iraq, Israel, Egypt, Greek Cyprus, Turkish Cyprus, and Greece, as well as the United States and China. Some foreign escapade will likely be Erdoğan's undoing.

Saudi Arabia

Saudi Arabia is the most unusual country in the world. Even if you're from, say, Qatar or Abu Dhabi, its social mores and governmental institutions are strange. It hosts, for example, not a single movie house. Men and women use separate elevators. Non-Muslims are forbidden to enter two of its cities (Mecca and Medina). A vice squad terrorizes the population. Christians get in trouble for praying, Jews are with rare exceptions prohibited.

In Saudi Arabia, even McDonald's has a "Ladies Section" (with noticeably slower service).

The government runs a powerful, competent police state with few pretenses of elections, a constitution, or the other rigmarole of dictatorships. It observes, censors, and intrudes. Police checkpoints proliferate. The government employs three different military forces—Pakistani mercenaries to defend the oilfields, a national army to protect the borders, and a tribal guard to protect the monarchy. Monarchies typically count 10, 20, or even 50 members in the royal family; the Al Saud has around 10,000 males (females don't count politically) and they constitute a *nomenklatura*, to use that helpful Soviet term. Family members run the country, which has been called the only family business with a seat at the United Nations.

But this structure now stands in danger. For 70 years, the monarchy looked to the U.S. government to provide external security. Now, for the first time, in the age of Obama, that assurance no longer exists, and especially not after the Iran deal, in which Washington aligned more closely with Tehran than with Riyadh. The Saudi leadership is taking steps to protect itself, the most notable one of which is working with Israel. It's a logical step, but still it's mildly astonishing. My prediction: it's temporary and will not outlast the crisis. Should a Republican become president in 2017, the relationship with Israel will close down.

Egypt

Abdel Fattah el-Sisi has now been in power for two years, since July 2013, in the aftermath of a massive demonstration against the Muslim Brotherhood president, Mohamed Morsi. Sisi has the right priorities in mind: suppressing the Islamists and fixing the economy. But I worry about his achieving success in either arena.

No one despises Islamists more than me. I endorse tough measures to battle this totalitarian movement, such as rejecting their efforts to apply Islamic law, excluding them from mainstream institutions, and banning their representatives from elections. But Sisi's heavy-handed and extra-legal policies go too far and are counterproductive. For example, sentencing nearly 600 people to death for the murder of a policeman, followed a month later by sentencing another near 700 people for the same murder, is not only massively disproportionate but also likely to backfire and help the Islamists gain sympathy.

The economy is the other major problem. In the 1950s, Gamal Abdel Nasser, also a military officer, put in place a socialist regime typical of that era, with great Soviet-style factories badly attempting import substitution. Not only is that system still in place but the state's economic role grew substantially under Mubarak and continues to grow further under Sisi. Both presidents keep retired military colleagues happy by giving them sinecures. "You're a retired colonel? Good, take over this cotton factory" or "Start this desert town." **Estimates suggest that about 25 to 40 percent of**

the Egyptian economy hobbles as part of "Military, Inc."

Also, a disdain for agriculture creates enormous problems, so that Egypt, both in absolute and relative terms, imports more of its caloric intake than any other country. For example, figures **for the fiscal year 2013-14 show that Egypt imported 5.46 million tons of wheat, or 60 percent of the country's total consumption, making it the world's largest wheat importer.** Once the breadbasket of the Nile, Egypt can no longer feed itself but instead depends on the Saudis and others for subventions to purchase food abroad. The recent gas field discovery in the Mediterranean will help, but will not solve this problem.

Sisi appears as unprepared to serve as president of Egypt as was another military man, Gamal Abdul Nasser, 60 years ago. In the acerbic analysis of the American analyst Lee Smith:

It's not an accident that an Egypt in decline gets a man like Sisi to step forward. Prideful and incompetent, Sisi nonetheless sees himself as part of a continuum of great Egyptian leaders, like Nasser as well as Anwar al-Sadat. Sisi told a journalist in an off-the record interview leaked to the media that he's been dreaming about his own greatness for 35 years. But the many choices Sisi made to get there show him to be dangerously over his head.

He still rides high, with impressive popularity ratings (recall the cookies and pajamas bearing his face), but should he falter, that support will quickly evaporate. Islamists will exploit his incompetence no less than he took advantage of their failures. The cycle of coups d'état threatens to repeat, with Egypt falling further behind, the precipice of disaster looming closer along with the prospect of massive emigration. I wish Sisi well but am braced for the worst.

Israel

In November 2000, Ehud Barak said that Israel resembles "a villa located in a jungle." I love that expression; and how much truer it is today, with ISIS on Israel's Syrian and Sinai borders, Lebanon and Jordan groaning under unsustainable refugee influxes, the West Bank in anarchy, and Gaza approaching the same?

Everyone knows about Israel's high-tech capabilities and military prowess. But much more about it is impressive bordering on extraordinary.

***Demography*:** The entire modern, industrial world from South Korea to Sweden is unable to replace itself demographically, with the single, outstanding exception of Israel. Societies need roughly 2.1 children per woman to sustain their populations. Iceland, France, and Ireland come in just below that level, but then the numbers descend down to Hong Kong with its 1.1 children per woman, or just over half of what's necessary for a country to survive long term. Well, Israel is at 3.0. Yes, the Arabs and the Haredim partly explain that high number, but it also depends on secular Tel Aviv residents. It's nearly unprecedented development for a modern country to have more children over time.

***Energy*:** Everyone knows the old quip about Moses taking a wrong turn on leaving Egypt. Well no, it turns out he didn't. Israel has as large an energy reserve as—get this—Saudi Arabia. Now, this resource is not as accessible, so it's far more expensive and complex to exploit than Arabia's enormous and shallow pools of oil, but it's there and Israelis will someday extract it.

***Illegal immigration*:** This is a brewing crisis for Europe, especially in summertime, when the Mediterranean and the Balkans become highways from the Middle East. Israel is the one Western country that has handled this problem by building fences that give control over borders.

***Water*:** Twenty years ago, like everyone else in the Middle East, the Israelis suffered from water shortages. They then solved this problem through conservation, drip agriculture, new methods of desalination, and intensive recycling. One statistic: Spain is the country with the second-highest percentage of recycling, around 18 percent. Israel does the most recycling, at 90 percent, five times more than Spain. Israel's now so awash in water that it exports some to neighbors.

In all, Israel's doing exceptionally well. Of course, it is under the threat of weapons of mass destruction and the delegitimization process. But it has a record of accomplishment that I believe will see it through these challenges.

Islamist Ideology: Three Types

Islamists can be broken down into three main forces:

***Shiite revolutionaries*:** Spearheaded by the Iranian regime, they are on the warpath, relying on Tehran's help, apocalyptic ideology, subversion, and (eventually) nuclear weaponry. They want to overturn the existing world order and replace it with the Islamic one envisioned by Ayatollah Khomeini. The revolutionaries' strength lies in their determination; their weakness lies in their minority status, for Shiites make up just 10 percent or so of the total Muslim population and further divide into multiple sub-groups such as the Fivers, Seveners, and Twelvers.

***Sunni revisionists*:** They deploy varied tactics in the common effort to overthrow the existing order. At one extreme stand the crazies – ISIS, Al-Qaeda, Boko Haram, Shabaab, and the Taliban, hate-filled, violent, and yet more revolutionary than their Shiite counterparts. The Muslim Brotherhood and its affiliates (such as President Erdoğan of Turkey) fill the middle ground, using violence only when deemed necessary but preferring to work through the system. Soft Islamists like Fethullah Gülen, Pennsylvania's Turkish preacher living in self-exile, forward their vision through education and commerce and work strictly within the system, but whose goals, despite their mild tactics, are no less ambitious.

***Sunni status-quo maintainers*:** The Saudi state heads a bloc of governments (GCC members, Egypt, Jordan, Algeria, Morocco), only some of which are Islamist, that wish to hold onto what they have and fend off the revolutionaries and revisionists.

Islamist Tactics: Violent vs. Lawful

Violent Islamists, Shiite and Sunni alike, are doomed. Their attacks on fellow Muslims alienate coreligionists. They challenge non-Muslims in precisely those areas where the latter are strongest; the combined might of the military, law enforcement, and the intelligence services can crush any Islamist uprising.

Islamist violence is counterproductive. Its drumbeat quality teaches and moves public opinion. Murderous assaults move opinion, not the analysts, the media, or politicians. An incident like the *Charlie Hebdo* massacre in Paris moves voters over to anti-Islamic parties. Blood in the streets teaches. It's education by murder.

In contrast, lawful Islamists working within the system are very dangerous. They are seen as respectable, appearing on television, appearing as lawyers in courtrooms, and teaching classes. Western governments mistakenly treat them as allies against the crazies. My rule of thumb: The less violent the Islamist, the more dangerous.

Therefore, were I an Islamist strategist, I'd say, "Work through the system. Cut the violence except on those rare occasions when it intimidates and helps reach the goal." In fact, the Islamists are not doing this, to their detriment. They are making a major mistake, to our benefit.

Islamism in Decline?

The Islamist movement could be on the way down due to infighting and unpopularity.

As recently as 2012, it appeared able to overcome the many internal tensions – sectarian (Sunni, Shiite), political (monarchical, republican), tactical (political, violent), attitudes toward modernity (Salafi, Muslim Brotherhood), and personal (Fethullah Gülen, Recep Tayyip Erdoğan). Since then, however, Islamists can't stop fighting each other. This fits an historic Middle Eastern pattern in which a victorious element tends to split. As it approaches power, differences become increasingly divisive. Rivalries papered over in opposition emerge when power is at hand.

Second, to know Islamists is to reject them. The massive Egyptian demonstrations after one year of Muslim Brotherhood rule offer the strongest piece of evidence for this conclusion. Other indications come from Iran (where a great majority of the population despises its government) and Turkey (where votes for the ruling Islamist party just went down by 20 percent).

Should these tendencies hold, the Islamist movement cannot succeed. Some already see the "post-Islamization" era as underway. Here is Haidar Ibrahim Ali of the Sudan:

We are witnessing the end of political Islam's era, which began in the mid-1970s, to be replaced by what Iranian intellectual Asef Bayat described as a "post-Islamization" era, when politically and socially,

following a period of trials, political Islam's vitality and attractiveness have been exhausted even among the most ardent of its supporters and enthusiasts.
These problems offer grounds for optimism but not for complacency, for trendlines can change again. The challenge of marginalizing Islamism remains alive.

Three Middle Eastern Political Forces
From a Western point of view, Middle Eastern political forces divide into three: the Islamist, the liberal, and the greedy. Each requires a specific approach.
We should reject any and all that is Islamist. As much as possible, this means not dealing with and never helping Islamists, whether as seemingly democratic as the ruling party in Turkey or as maniacal as the ISIS militias, for they all aspire to the same ugly goal of imposing Islamic law. Just as we're wall-to-wall anti-fascist, let us similarly be resolutely anti-Islamist. That said, we have a major relationships with Turkey, Saudi Arabia, and other states, so raison d'état requires tactical compromises.
In contrast, we should always favor those called liberals, moderns, seculars, or Tahrir-Square types; they aspire to a better Middle East and are the region's hope. We in the West are their model; they look to us for moral and practical sustenance. The West must stand by them because, however distant from the corridors of power and forlorn their circumstances, they point to a better future.
The third group, that of greedy kings, emirs, presidents and other dictators, requires more nuance. We should cooperate with them but also constantly pressure them to improve. For example, with the exception of a mere two years, 2005-06, Western governments did not pressure Hosni Mubarak, the tyrant who ruled Egypt for 30 years; we didn't encourage political participation, advocate for the rule of law, or demand personal freedoms. Had we consistently taken those steps, Egypt would be in a much better place.
In sum: reject Islamists, accept liberals, deal warily with dictators.

American Policy
U.S. foreign policy has been thoroughly inconsistent the past fifteen years:
In a high-minded way, George W. Bush tried to attain too much in the Middle East—a free and prosperous Iraq, a transformed Afghanistan, a solution to the Arab-Israeli conflict, democracy throughout. Brushing up against the region's hard realities, he failed in all these efforts.
Barack Obama did the opposite—too little—and he too failed. Boiled to its essence, his policy amounts to "Downgrade US interests, snub friends, and seek consensus." He snubbed the Iranian uprising, abandoned long-standing allies, tried to leave the region to pivot to Asia.
This outlook marks the president as a standard-issue American leftist, not an outlier. Although he was born and raised a Muslim, this background does not have a perceptible impact on his policies. His political views alone explain his outlook.
Iran is the one (inexplicable) exception to this pattern: the past 6½ years reveal that Iran – and not China, Russia, Mexico, Syria or Israel – has been Obama's top foreign affairs priority.
I suggest a US policy between these two extremes: one defined by the protection of Americans and American interests. Promoting American interests offers a guideline to decide where to get involved and where not to. This also has a benign impact on allied countries, such as Canada.

Conclusion
A region notorious for its problems also offers some good news. Tyranny is shakier than five years ago. Islamists are weakened by their infighting and unpopularity. The foul Syrian and Iraqi states are dying, Kurdistan is emerging. Israel is flourishing. Gulf Arabs, especially in Dubai and Abu Dhabi, are experimenting with new paths to modernity. So, amid a sea of misfortune and even horrors, there are also some wisps of hope in the Middle East. Policy makers should note these and build on them.

Daniel Pipes *is president of the Middle East Forum.*

World's First Fully Integrated Anti-UAV Defense System

Source: http://i-hls.com/2015/09/worlds-first-fully-integrated-anti-uav-defense-system/

Sept 12 – **The world's first fully integrated detect-track-disrupt Anti-UAV Defense System (AUDS) – launched by a trio of British companies in May this year – now features a quad band radio frequency (RF) inhibitor/jammer, an optical disruptor and rapid deployment features in the final production version of the market leading counter-drone system.** These enhancements follow extensive customer trials of the pre-production system across Europe and North America over the spring and summer.

The AUDS system, developed by Blighter Surveillance Systems, Chess Dynamics and Enterprise Control Systems, is designed to combat the growing threat of malicious micro, mini and larger unmanned aerial vehicles (UAV) or drones. **The system can detect a drone five miles (8km) away using electronic scanning radar, track it using infrared and daylight cameras and specialist software before disrupting the flight using an inhibitor to block the radio signals that control it.**

According to the AUDS team, the speed with which new features have been added to the system since the launch in May, demonstrates both the agility and flexibility of the trio of specialist companies. The quad band inhibitor enables the AUDS operator to disrupt the different licensed telemetry bands of commercial drones no matter where in the world they are designed and licensed for use. For example, both the 433 and 915 MHz frequencies commonly used by unmanned aircraft systems (UAS) can be disrupted as can the 2.4 GHz control band and the global satellite (GNSS) bands.

The new optical disruptor is yet another tool available to the AUDS operator. This feature can be utilised for both pointing at a drone for identification purposes and disrupting the automatic gain control settings in the drone's camera system such that the operator loses visibility. The optical disruptor can also provide a very precise identification of known UAV launch activity to any ground forces.

Other improvements in the production version of the AUDS system include a new positioner for the camera. And, following a whole series of trials in a variety of different terrains, the team has modularised the system to reduce the single lift weight down to 25kg. All the different elements – radar, cameras, and RF inhibitor – now clip together to form a complete system.

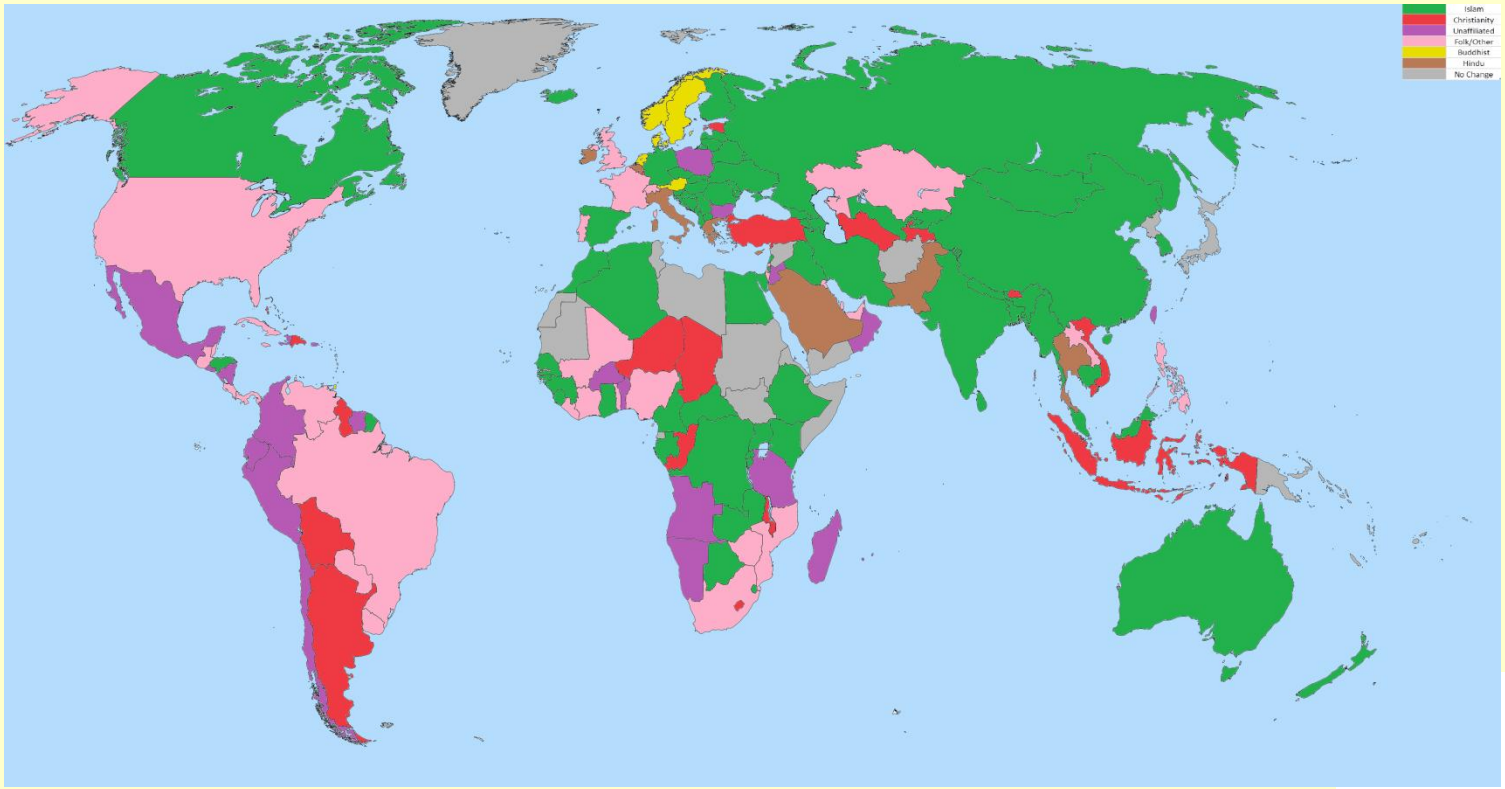
The Anti-UAV Defense System (AUDS) integrates the Blighter A400 Series Ku band electronic scanning air security radar, Chess Dynamics' stabilised electro-optic director, infrared and daylight cameras and target tracking software, and a directional radio frequency (RF) inhibitor from Enterprise Control Systems to detect, track, classify, disrupt and neutralise UAVs at ranges of up to 8km. The AUDS system is even effective against so-called Group 1 micro UAVs at ranges of up to 2km and Group 1 mini UAVs at ranges of several kms.

The AUDS system is designed for countering drones or remotely piloted aircraft systems (RPAS) in remote border sites or urban areas. It can be operated from fixed locations and from mobile platforms. It has been

developed and manufactured in the UK using British technology and a production version is available now at COTS prices starting at less than £800k.

Fastest Growing Religion In Each Country Around The World

Source: http://brilliantmaps.com/fastest-religion/



The map above shows which religion is the fastest growing in each country around the world based on data from Pew Research Center's The Future of World Religions: Population Growth Projections, 2010-2050.

The colours are as follows:

- Green = Islam
- Red = Christianity
- Purple = Unaffiliated
- Pink = Folk/Other
- Yellow = Buddhist
- Brown = Hindu
- Grey = No Change

It's important to note that the map shows which religion will have the largest relative, not absolute, increase between 2010 and 2050.

So for example, Folk and other regions are expected to grow from 0.8% of the US total in 2010 to 2.0% (150% increase) in 2050, while Christianity is expected to fall from 78.3% to 66.4% (15% decrease) in the same time period.

However, the total size of the Christian population of the US will still increase from around 243 million today to 261 million (18 million more) in 2050, while folk and other religions will increase from 2.5 million to 7.9 million (5.4 million more) in the same time period.

In relative terms Islam is doing well, becoming the fastest growing religion in both China and India (the world's two most populous countries) and Russia and Canada (the world's two largest countries by area). However, despite anti-immigrant feelings in the UK or France it's not the fastest growing religion in either country.

Christianity is growing fastest in a few interesting place such as the predominantly Muslim countries of Turkey and Indonesia.

Unaffiliated groups are growing fastest in some of the more Catholic countries around the world in South America, Mexico and Poland along with several countries in Africa.

Folk/Other religions are doing well in the United States, UK, France, Brazil and many other countries.

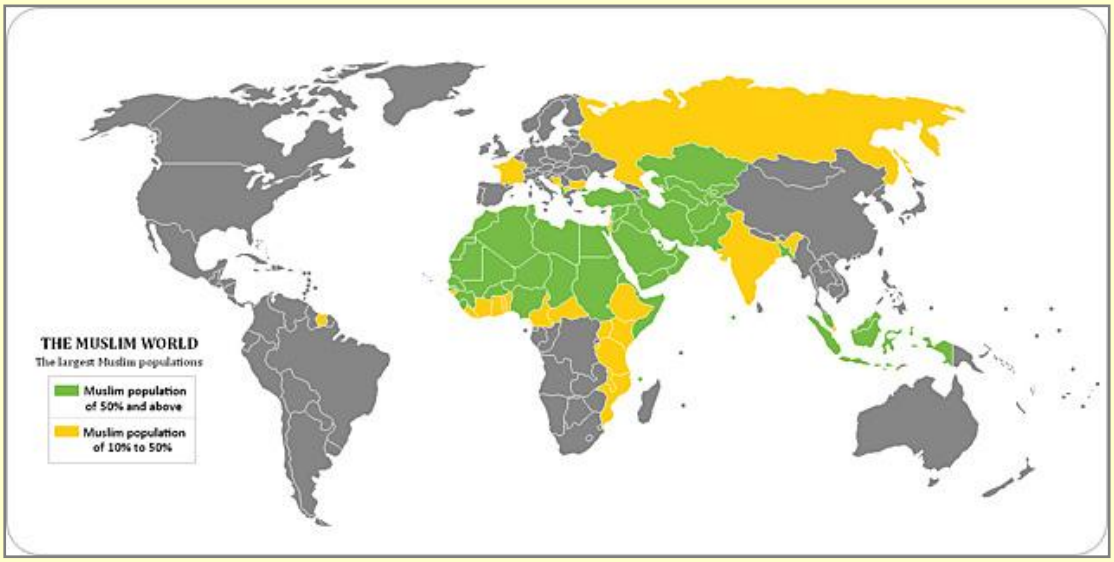
Buddhism seems to be growing fastest in the Scandinavian countries (plus Austria and the Netherlands), far from its base in Asia.

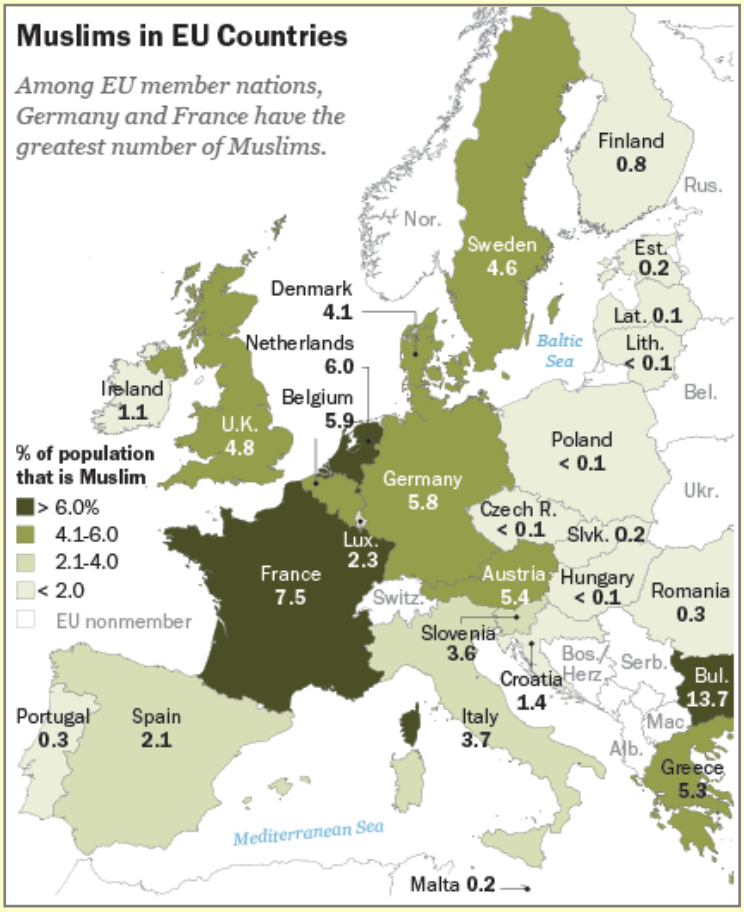
Hindus are growing quickly in an interesting mix of countries from Muslim Saudi Arabia and Pakistan to Catholic Italy, Ireland and Belgium.

Here's how PEW defined each group:

Islam/Muslims

There are two major branches of Islam – Sunni and Shia. As of 2010, it was estimated that the overwhelming majority (87-90%) of Muslims





were Sunnis; about 10-13% were Shia Muslims. However, with little data on population differences among Muslim subgroups around the world, this report does not project the future size of Sunni and Shia populations.

Christianity

This analysis looks at Christians as a single religious group and does not project changes among Christian subgroups.

Note: the report includes Catholics, Protestants, Orthodox as Christians along with Mormons, Christian Scientists and Jehovah's Witnesses.

Unaffiliated

The religiously unaffiliated population includes atheists, agnostics and people who do not identify with any particular

religion. However, many of the religiously unaffiliated do hold some religious or spiritual beliefs.

Folk/Other
Folk religions are closely tied to a particular people, ethnicity or tribe. In some cases, elements of other world religions are blended with local beliefs and customs. These faiths often have no formal creeds or sacred texts. Examples of folk religions include African traditional religions, Chinese folk religions, Native American religions and Australian aboriginal religions.

Other
"Other religions" is a residual category composed of groups not classified elsewhere. This very diverse category includes followers of religions that often are not measured separately in censuses and surveys: the Baha'i faith, Jainism, Shintoism, Sikhism, Taoism, Tenrikyo, Wicca, Zoroastrianism and many other religions. Because of a lack of data on these faiths in many countries, the individual religions within this category are not projected separately. Rather, they are combined and treated as a whole. This means the growth trajectories of specific religions in this category could vary greatly.

Buddhist
The three major branches of Buddhism in the modern world are Mahayana Buddhism, Theravada Buddhism and Vajrayana (sometimes described as Tibetan) Buddhism. […] The Buddhist population figures in this study also include members of other groups that identify as Buddhist, such as Soka

Hinduism
Major traditions within Hinduism include Vaishnavism, which is devoted to worship of the god Vishnu, and Shaivism, organized around worship of the god Shiva. Because of a lack of census or survey data on subgroups of Hindus in most countries, however, reliable estimates of the global size of various Hindu traditions are not available.

▶ **You can see data for each country in the** full report here.

▶ **For the current state of the world's religions check out:** Incredibly Detailed Maps Of The World's Religions

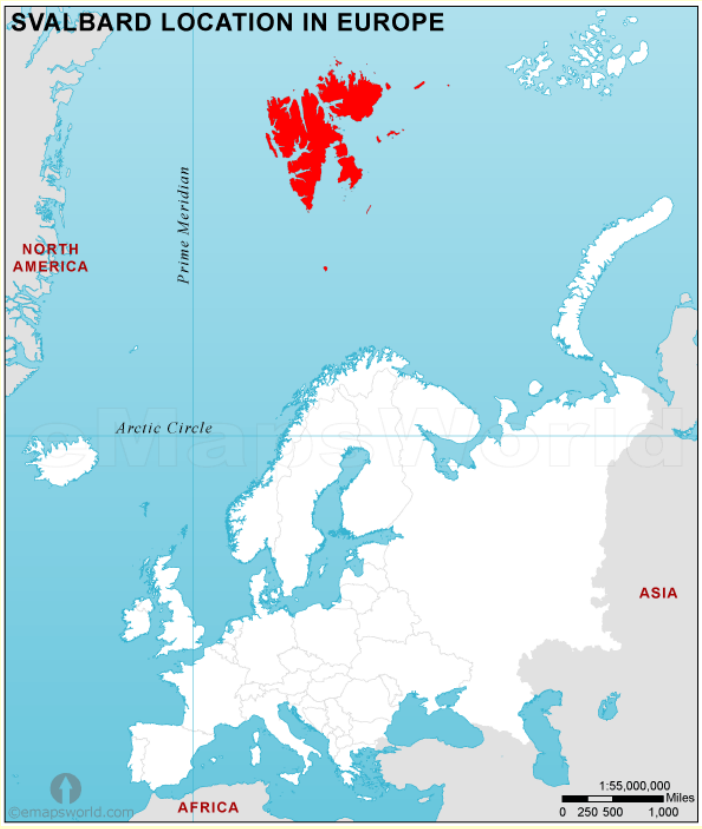
Norwegian politicians propose putting refugees on Svalbard – remote Arctic islands with more polar bears than people

Source: http://www.independent.co.uk/news/world/europe/norwegian-politicians-propose-putting-refugees-on-svalbard--remote-arctic-islands-with-more-polar-bears-than-people-10498859.html

Country's Green Party hopes that putting people on the archipelago will boost employment for the 2,600 people who live there – who are outnumbered by the 3,000 polar bears

Sept 13 – Norwegian politicians are looking into sending refugees to Svalbard, an Atlantic archipelago that is one of the world's most remote areas – and which is currently inhabited by more polar bears than people.
Local representatives hope that Svalbard could receive and then home refugees.

The party has asked Svalbard's Governor to look into the legality of the plan, which could be undone by the fact that Svalbard isn't part of the Schengen free movement area and so can't take people as easily, according to local reports.



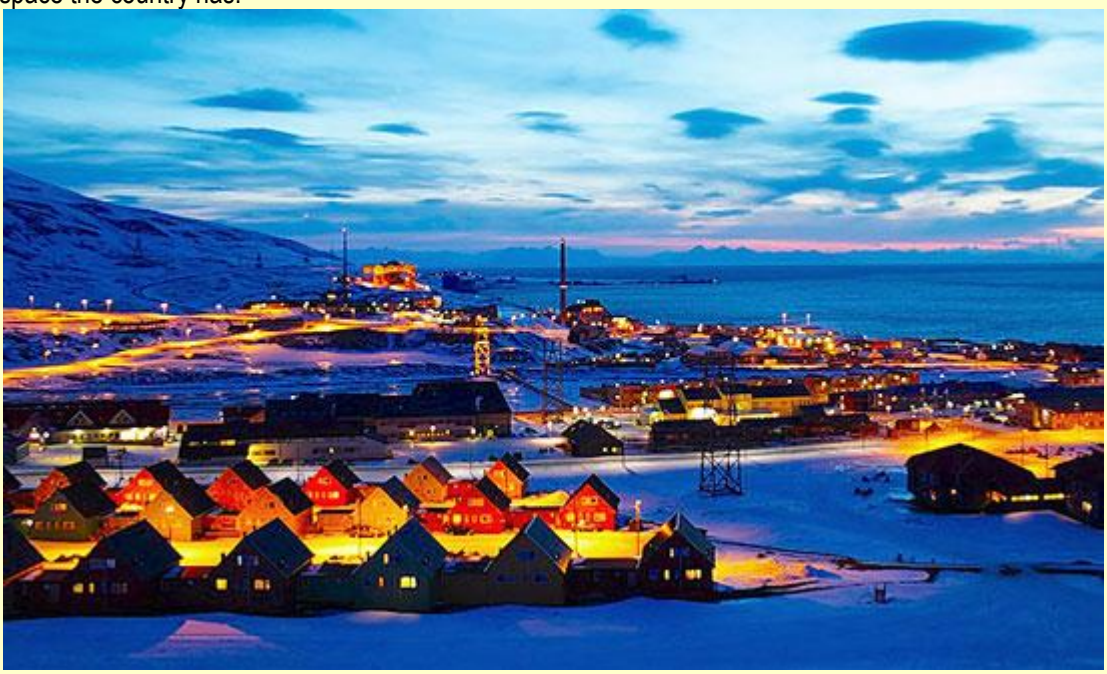
Local politicians have committed to work "100 per cent" for a quick realisation of the plan if it is proved legal, according to local reports.

Many of the people living on the islands are employed by coal miners. But that work is precarious – one of the country's main employers, miner Store Norske, announced recently that it would be sacking 150 employees.

Building a reception centre for migrants would be safer work, as well as helping fulfill the country's moral obligation to migrants, according to the politicians proposing it.

"A reception centre would of course create jobs, but that is a positive side effect of something much more important than coal mining, that's not our primary concern," Espen Klungseth Rotevatn, the leader of the Green Party on the islands, told the local Vårt Land newspaper. "Europe is on fire, and it is now that our values and ethical standards are put to the test."

The only group to propose putting people on the island in the past has been the country's anti-immigration Progress Party. One member proposed in May that Norway should send 10,000 immigrants to the islands – later retracting his statement and saying it was simply a way of demonstrating how little space the country has.



Right-wing politicians have previously suggested that the islands be used as a prison camp for addicts and criminals.

It isn't clear that Norway would be able to send refugees to Svalbard, because of the special status of the islands. But politicians hope that might actually make it easier for people to live and work there.

The Greens hope to make use of a special treaty signed in 1920 to send people to the island. The Svalbard Treaty has been signed by over 40 countries and says that all signatories have equal rights to engage in commercial activities there, but recognizes the sovereignty of Norway over the islands.
While Syria hasn't signed the agreement, Afghanistan has. And politicians hope that the special status of international people on the islands could make it more able to take in refugees.
It wouldn't be the first time that Norway is housing refugees through a legal loophole – it emerged last month that some people were heading into the country on bikes, to get around a stipulation that refugees cannot enter the country by foot or in someone else's car.

DARPA demonstrates robotic landing gear for helicopters

Source: http://www.gizmag.com/darpa-robotic-landing-gear-helicopters/39379/

Sept 12 – Helicopters are versatile machines capable of all manner of maneuvers in the air, but when it comes to takeoffs and landings they are very fussy creatures, preferring flat, level pads, which are scarce in combat and rescue missions. DARPA recently demonstrated a new robotic landing gear system in an unmanned flight near Atlanta, Georgia, that's designed to overcome these limitations by enabling landings on broken or uneven terrain with a high degree of safety.

Despite decades of development, most helicopters rely on very simple skid-or-wheels landing gear that wouldn't look out of place on a Wright flier. When taking off and landing, helicopters need to remain fairly level to avoid tipping their rotors, which could suddenly collide with the ground or become a menace to boarding passengers. The result is that many times helicopters are forced to hover precariously a few feet above a hillside or broken field while they're loaded and unloaded. It's an unsatisfactory solution and one reason why helicopter pilots tend to retire young.
The new robotic landing gear is currently under development by the Georgia Institute of Technology under funding from DARPA's Mission Adaptive Rotor (MAR) program. Its recent flight was unveiled at the agency's *Wait, What? A Future Technology Forum* in St. Louis.

The adaptive system consists of a four-legged undercarriage that replaces the standard landing gear. The effect is four independently articulated legs that make it look as if the helicopter could walk away

under its own power. Instead, the legs fold up against the fuselage of the ship after takeoff and extend on landing. Each leg has a force-sensitive contact sensor in its foot and all four are designed to work in concert as a computer makes real time calculations of the best angles to set the legs in order to keep the ship level and stable, without risking the rotor hitting the ground.

According to DARPA, the new landing gear is easily installed, only modestly increases the weight of the craft, reduces the risk of damage from hard landings by 80 percent, and allows helicopters to set down on 20-degree slopes – twice that of current designs. In addition, it allows helicopters to make landing on decks in high seas that currently require them to be winched down.

Europe's refugee crisis: the last time round it was much, much worse

By R. M. Douglas

Source: http://www.homelandsecuritynewswire.com/dr20150921-europe-s-refugee-crisis-the-last-time-round-it-was-much-much-worse

Sept 21 – As train after train of refugees arrives in Germany, swamping the railway stations and stretching the capacities of welfare organizations, a senior Berlin-based administrator protests against the strain the newcomers are placing on the country's resources.

Germany, he warns, cannot go on indefinitely being treated "as a waste-paper basket with a limitless capacity for the unwanted waste of the world."

More importantly, the scale of the influx is in danger of giving rise to a toxic brew of resentment on the part of the indigenous population that might well lead to neo-Nazism and ultra-nationalism once again becoming significant forces.

"Do we not now," he asks, "tend to compress that mixture to the point of detonation?"

Crassly worded though his protest may be, the speaker's concerns are widely shared by those responsible for Germany's, and Europe's, governance. Yet he is not himself a German, nor is he referring to the refugees coming from Syria or Libya in the summer and autumn of 2015.

His name is Colonel Ralph Thicknesse, a migration specialist in the British army of occupation after the Second World War, and he is expressing his alarm in the summer of 1946 over the worst refugee crisis in Europe's history — one deliberately created by the victorious Allies themselves.

This episode, which is examined in my book *Orderly and Humane: The Expulsion of the Germans after the Second World War*, provides essential context for the way in which Europeans in general, and Germans in particular, are today approaching a problem that has forcefully reminded many of them of their own traumatic postwar experiences.

Trouble with minorities

Before 1939, millions of German speakers lived in communities scattered throughout central and southeastern Europe — in Czechoslovakia, Poland, Hungary, Yugoslavia, Romania, and even the Soviet Union.

After the First World War, they became minorities in the new states created in the Paris peace settlement. Resentful of their drop in status, undesired by their new rulers who viewed them as impediments to the creation of "pure" ethno-national countries in the region, they were a source of — and pretext for — international instability in the interwar era.

Indeed, it was the condition of the German minority in Danzig and the so-called Polish "Corridor" that provided the excuse for Adolf Hitler's launching of another world war in September 1939.

After the war, Winston Churchill of Great Britain, U.S. President Franklin D Roosevelt, and Soviet leader Joseph Stalin were each resolved that there would be no repetition of this problem.

By 1944, they had agreed that all German speakers in Czechoslovakia and Hungary, regardless of age or sex, would be driven out en masse and deposited in the rubble of the Reich. Churchill promised: "There will be no mixture of populations to cause endless trouble…a clean sweep will be made."

That was not all. To compensate Poland for territorial losses to the Soviet Union, the Allies transferred 40,000 square miles of eastern Germany — an area larger than Portugal — to Warsaw's control. Approximately eight million Germans living in this region were also marked for forcible displacement.

Millions expelled

During the immediate postwar years, the Allies thus devoted themselves to the expulsion from their homes of between 12 and 14 million people: the largest single episode of ethnic cleansing in human history.

Not all of those targeted waited to be physically removed.

Millions fled westward as the Red Army swept into Germany in early 1945, becoming permanently displaced when the Allies forbade their return. After V-E Day, millions more swamped German cities, when they were force-marched at bayonet point to the frontiers by Polish and Czechoslovak troops or placed in overcrowded cattle cars. More than four-fifths of the expelled were women, children, or old people.

In the single month of July 1945, 550,000 of them, most possessing no more than the clothes on their backs, were dumped in Berlin, leading the Soviet authorities optimistically but futilely to issue a temporary ban on further arrivals.

Other German and Austrian cities — Munich, Leipzig, Vienna — had to cope with a similar influx. For the better part of two years, the trains continued to arrive from the south and east, each day decanting the equivalent of the population of a small town on Germany.

A man-made disaster

A humanitarian catastrophe was inevitable, and in fact had been acknowledged as such by the Allies themselves before the operation ever began.

Often subjected to severe maltreatment prior to or during their expulsion, including sexual violence on a massive scale, the predominantly female expelled population more often than not reached Germany in deplorable physical condition.

Many did not survive the ordeal.

Gerald Gardiner, the future British lord chancellor, was one of many international observers to find disturbing resonances in the scenes unfolding at the disembarkation points: "The removal of the dead in carts from the railway stations was a grim reminder of what I saw in early days in Belsen."

Through herculean effort, largely on the part of the Germans themselves, the refugees were eventually resettled in West and East Germany.

By then, though, at least 500,000 had died as a result of hunger,

disease, rapes, beatings, or extrajudicial executions by soldiers and militia of the expelling countries.

What it all means for today's refugee crisis

This enormous man-made disaster, to which too little attention has been given, carries lessons for Europe today.

The first, paradoxically, is to set contemporary problems in perspective.

Substantial though today's exodus from the Middle East may be, it pales in comparison to the situation Germany faced and surmounted after the war. The arrival of up to a million newcomers in 2015 presents' real challenges, but a prosperous European Union with a population in excess of 500 million has the means to overcome them.

The fact that nearly three-quarters of the refugees are healthy working-age men, in contrast to the expelled population of seventy years ago, will further reduce the economic burden of absorption.

A second lesson is that the problem of forced migration cannot be solved by asylum and assimilation policies alone.

Despite the expelling countries' best efforts, not all German speakers ended up being removed from Eastern Europe in the 1940s. The deportations largely came to an end in mid-1947, when the Big Three powers, alarmed by the social and economic chaos their policies were creating in Germany, gave orders to Poland, Czechoslovakia, and Hungary that the transports must cease.

The Allies had the political resolve and military capacity to make that decision stick. The European Union today does not.

Because forced displacements in the modern world are nearly always the product of political and strategic initiatives — in the current instance, those taken by governments and armed nonstate actors in the Middle East and North Africa — they will continue until the EU acquires the means to counteract them.

But the final point to note is that Colonel Thicknesse's warning about the political consequences of a purely reactive response to the refugee crisis is not to be ignored.

The EU is a union of democracies, all of whose leaders are answerable to their electorates. Germans today have taken the lead in extending a welcome to the displaced Middle Easterners in large measure because memories of the *Vertreibung*, or "Expulsion," in which so many of their parents and grandparents suffered, remain fresh.

But not the entire continent shares their history, and the EU's leaders are not in a position to compel their peoples to accommodate fresh waves of refugees as the defeated Germans were forced to accept their uprooted cousins after the war.

Long before the limits of Europe's demographic or economic absorptive capacities are reached, voters are likely to rebel against open-ended commitments to find homes for the victims of collapsing states and civil wars in the Middle East.

If the continent's leaders are not to bring about political changes that may have destructive consequences for the rights-based framework upon which the postwar European project has been built, it seems clear that they will have to demonstrate their ability to address the problem of forced migration at its source.

R. M. Douglas *is Russell Colgate Distinguished University Professor of History, Colgate University.*

SAMS Hospital Sees Mustard Gas Victims in Mare'e, Aleppo

Source: https://www.sams-usa.net/foundation/index.php/component/content/article/2-uncategorised/177-press-release-sams-hospital-sees-mustard-gas-victims-in-mare-e-aleppoaugust-23-2015-washington-dc-more-than-50-shells-fell-on-civilian-areas-in-mare-e-northern-aleppoon-friday-following-these-attacks-a-sams-field-hospital-in-mare-e-received-more-than-50-c

For Immediate Release
August 23, 2015

Washington, DC - **More than 50 shells fell on civilian areas in Mare'e, northern Aleppoon Friday. Following these attacks, a SAMS field hospital in Mare'e received numerous patients with shrapnel wounds and more than 23 civilians exhibiting symptoms of chemical exposure.** Initial symptoms included respiratory irritation, wheezing, coughing, vomiting, irritation and redness of the eyes and mucous membranes, skin irritation, and severe itching. The 23 civilians who suffered from exposure displayed skin blisters and lesions, with doctors identifying the agent to be mustard gas. Patients were treated with dressings for skin lesions, bronchodilators, antidotes, and oxygen. No deaths have been reported from exposure as of yet. Samples have been taken from patient blood, clothing, and hair as well from the shelling site to be assessed. Mare'e is on the frontline of fighting between ISIS and non-state armed groups, and the SAMS-supported hospital in Mare'e has witnessed increased levels of civilian injuries and mass displacement in recent months.

Perpetrators of the attack have not been confirmed, but local sources suspect ISIS forces of conducting the attack. ISIS has also been accused of using mustard gas in recent attacks in northern Syria and Iraq. The targeting of civilians and the use of mustard gas are flagrant violations of international humanitarian law as per the Geneva Convention and Chemical Weapons Convention. SAMS demands the protection of civilians throughout Syria from aerial

attacks, barrel bombs, and chemical weapons by all means necessary, including no-bombing zones.

Toward a WMD-capable Islamic State?

By Can Kasapoglu
Source: http://www.jpost.com/Opinion/Toward-a-WMD-capable-Islamic-State-413041

Recently, The Wall Street Journal reported that Islamic State (IS) used chemical weapons (CW), most probably mustard gas, against Kurdish forces in Iraq. Mustard gas, a blister agent, is not as deadly as nerve agent CWs, and the alleged was not even on a tactical level. Yet if true, this incident would suggest a critical turning point for the IS threat in the Middle East.

More than WMD terrorism

The CW allegations about IS cannot be simply reduced to a case of WMD terrorism.

Clearly, IS is a political-military entity, which could be categorized as a "proto-state" with revolutionary jihadi-Salafist doctrinal references. It poses an existential threat to nearly all state actors and societies in the region, including the two democracies NATO - member Turkey and Israel, as well as Shi'ite theocracy Iran and the GCC monarchies.

Without a doubt, such a political-military terrorist entity needs ultimate security assurances – enter strategic weapons.

The military-strategic culture in the Middle East tends to see strategic weapons as means of compensating for conventional-military shortcomings, ensuring regime security through deterrence.

This paved the ground for Ba'athist Syria's chemical and biological weapons (CBW) programs, Saddam Hussein's pursuit of all kinds of WMDs and their delivery means, as well as Iran's ballistic missile proliferation and nuclear program.

Islamic State's dangerous WMD ambitions

The recent reports on IS's CW use are not the first indication that the terrorist quasi-state is "interested" in WMDs.

In early 2015, US CENTCOM announced the death of one of Saddam Hussein's chemical weapons experts, Abu Malik, in a coalition air-strike targeting IS positions. Furthermore, in 2014, a laptop captured from an IS-member Tunisian national revealed an instructive document on developing biological weapons, particularly on weaponizing the bubonic plague. Notably, the bubonic plague was used between 1937 and 1945 by the notorious Japanese Unit 731 in China during the biological and chemical warfare campaign under General Shirō Ishii's command. General Ishii' forces sprayed infected fleas and dropped specially designed bombs on the civilian population for ethnic cleansing purposes.

Recently some intelligence agencies also publicly voiced their concerns about IS's interest in radiological material and suspected attempts to obtain "dirty bombs."

Between stoppable and inevitable

If Islamic State survives, it will probably acquire some level of CBW capability.

Unfortunately, current technological and scientific trends could unwittingly ease such a scenario by making CBW components more accessible to nonstate actors. Firstly, CBWs depend on dual-use technologies, many of which are commercially available. IS would not face many hardships in obtaining the bio-reactors and agricultural sprayers required to weaponize naturally occurring pathogens. When it comes to bioengineering and genetic modification more advanced scientific know-how is needed, but it is not unimaginable that IS will develop such capabilities.

The latter possibility would seriously stress the medical counter-measures of neighboring states, as modified pathogens would bear little semblance to natural diseases.

Secondly, commercially available chemicals and emerging micro-reactor technologies are expected to make chemical weapons more precise, lethal and complicated in future.

Thirdly, it is not a secret that some remnants of the Iraqi Ba'athist regime are aligned with IS now, and Hussein-era Iraq was infamous for CBW development.

Finally, as the dust settles following some optimists' premature euphoria with regard to the Syrian CW disarmament, it has now surfaced that the US

Central Intelligence Agency is not convinced the Assad regime acted transparently.
Some experts also believe Assad might have even hidden part of deadly VX agent arsenal. If confirmed, we can fairly say that now there exists risk in Syria that IS could obtain CW capability equivalent in destructive potential to a low-yield tactical nuclear weapon.

Future WMD-capable IS?

In sum, while political scientists keep discussing whether IS could be a "real state" in the Middle East in a Weberian sense, the sober wisdom of the War Studies discipline suggests that it will be very difficult for the apocalyptic terrorist entity to become a true and permanent state actor in the region without obtaining some kind of strategic weapons capabilities.
Unchecked, this scenario could well become reality.
In order to prevent such an doomsday scenario, the international community must re-examine Syrian CW declarations and verifications, closely monitor both persons with critical scientific knowledge and information flow into IS-controlled areas, and trace the sensitive dual-use technology transactions in the region.

Can Kasapoglu *is a research fellow at Istanbul-based independent thinktank EDAM, and an academic at the Girne American University.*

Saudi Cleric Who Issued Fatwa on WMD Permissibility Pledges Allegiance to ISIS

Source: http://pjmedia.com/blog/saudi-cleric-who-issued-fatwa-on-wmd-permissibility-pledges-allegiance-to-isis/

A prominent Saudi cleric and ally of Osama bin Laden who issued a 2003 fatwa permitting the use of weapons of mass destruction in jihad has pledged his allegiance to the Islamic State.

Nasser bin Hamad al-Fahd is behind bars in Saudi Arabia, but his direction for squabbling Muslim factions to unite behind Abu Bakr al-Baghdadi as caliph could have significant reach — along with the fresh distribution of his fatwas on social media networks.
"I advise you to join, all of you, the Islamic State and to pledge allegiance to its leader, Amir al-Mumineen Abu Bakr al-Baghdadi – may Allah protect him – and fight under his banner," al-Fahd wrote. "It is the state that raised the banner of Islam, and established Tawhid, and destroyed the idols, and implemented the Sharia. Allah has purified it from implementing man-made laws, from standing with the Disbelievers, and from supporting the Tawaghit, and has protected it from innovations, and misleading paths."

He acknowledged that ISIS has made mistakes, but they should be forgiven since they're under such pressure all the time.
"As to those who keep counting its mistakes, we say: Nobody is exempt from mistakes, and whatever the time in history, and however pure you might be. All sons of Adam make mistakes, and exemption from mistakes is only for the Prophets," al-Fahd wrote. "…What could we say about this blessed State? It has just emerged, still lacking capabilities, besieged, attacked from every side, arrows pointing to it from all around, its been defamed, slandered by all imaginable means, nations from all over the world agreed to fight it, and the scholars of the Tawaghit, the scholars of shame, the callers to falsehood, the mules of the sultans in every country have defamed and slandered it, and lied about it lies we have never seen in history. So how could they not make mistakes when they are in this situation?"

Some al-Nusra supporters online were claiming that the signature on the letter was forged, sparking a back-and-forth on Twitter between ISIS and al-Nusra/al-Qaeda supporters.

But needless to say, ISIS backers celebrated the news — and trumpeted his old fatwas for jihadis to catch up on.

In his 2003 WMD fatwa, al-Fahd ruled, "If the infidels can be repelled from the Muslims only by using such weapons, their use is permissible, even if you kill them without exception and destroy their tillage and stock."

The international banning of certain types of weapons, he stressed, has no meaning under Islamic law. Under the Quran, he said, "One kills in a good manner only when one can. If those engaged in jihad cannot do so, for example when they are forced to bomb, destroy, burn, or flood, it is permissible."

"The infidels might be in such a position that they cannot be resisted or repelled from Islamic territory and Muslims be spared their violence unless they are bombed with what are called weapons of mass destruction, as people with experience in jihad affirm. If people of authority engaged in jihad determine that the evil of the infidels can be repelled only by their means, they may be used. The weapons of mass destruction will kill any of the infidels on whom they fall, regardless of whether they are fighters, women, or children. They will destroy and burn the land. The arguments for the permissibility of this in this case are many," al-Fahd continued.

"…Anyone who considers America's aggressions against Muslims and their lands during the past decades will conclude that striking her is permissible merely on the basis of the rule of treating as one has been treated. No other arguments need be mentioned."

At another point in the fatwa, he directs that "jihad is not to be halted because of the presence of infidel women and children."

In another fatwa that year, al-Fahd ruled on taking the fight to Americans outside of Iraq.

"The Muslims, in their eyes, are nothing but a collection of insects whose extermination from the world is necessary," he said. "So doing jihad against those cursed ones, and awaiting for them, and fighting them wherever they may be is from the most important of obligations, and the greatest of things that can bring you close to Allah."

In 2012, al-Fahd ruled that jihad against Jews is "one of the most important duties and greatest virtues" for Muslims.

"If I had ten arrows, I would have shot all of them, not at anyone else," he said. "By Allah, had I been able to carry out a martyrdom operation against them, I would not have hesitated for a moment."

Today, al-Fahd told jihadists to "know that the only side profiting from your disunity and multiples groups are the disbelievers and the enemies of Islam, so fear Allah, and unite yourself and grasp a single rope, and don't break the ranks."

Combined Joint Chemical, Biological, Radiological and Nuclear Defence Task Force

The Alliance's multinational CBRN defence capability

Source: http://www.nato.int/cps/en/natohq/topics_49156.htm

NATO today faces a whole range of complex challenges and threats to its security. Current threats include the proliferation of weapons of mass destruction (WMD) and their delivery systems. Rapid advances in biological science and technology also continue to increase the bio-terrorism threat against NATO forces and populations. The Alliance needs to be prepared to prevent, protect and recover from WMD attacks or CBRN[1] events.

Chemical, biological, radiological and nuclear (CBRN) material is used as an umbrella term for chemical, biological and radiological agents in any physical state and form, which can cause hazards to populations, territory and forces. It also refers to chemical weapons precursors and facilities, equipment or compounds that can be used for development or deployment of WMD, CBRN weapons or CBRN devices.

Background

The NATO Combined Joint CBRN Defence Task Force, which consists of the CBRN Joint Assessment Team (JAT) and the CBRN Defence Battalion, is a NATO body specifically trained and equipped to deal with CBRN events and/or attacks against NATO populations, territory or forces.

commitments made by Allies at the 2002 Prague Summit: a Prototype Deployable Nuclear, Biological and Chemical (NBC) Analytical Laboratory and a Prototype NBC Event Response Team. These capabilities greatly enhance the Alliance's defence against WMD.

The CBRN Defence Battalion's mission is to

The Battalion and the JAT, created in 2003 and declared operational the following year, are a multinational, multifunctional team, able to deploy quickly to participate in the full spectrum of NATO operations.

The Battalion trains not only for armed conflicts, but also for deployment in crisis situations such as natural disasters and industrial accidents, including those involving hazardous material. To maintain the Task Force's specialised skill, NATO's Defence Against Terrorism Programme of Work (DAT POW) supports training exercises.

Authority, tasks and responsibilities

The Combined Joint CBRN Defence Task Force benefits from two of the capability

provide a rapidly deployable and credible CBRN defence capability in order to maintain NATO's freedom of action and operational effectiveness in a CBRN threat environment.

The Battalion may be used to provide military assistance to civil authorities when authorised by the North Atlantic Council (NAC), the Alliance's principal political decision-making body. For example, it played a key planning role during the 2004 Summer Olympics in Greece, and the 2004 Istanbul Summit, where it supported CBRN-related contingency operations.

The Battalion is capable of conducting the following tasks:

- CBRN reconnaissance and monitoring operations;

- Sampling and identification of biological, chemical, and radiological agents (SIBCRA);
- Biological detection and monitoring operations;
- Provision of CBRN assessments and advice to NATO commanders;
- CBRN hazard management operations, such as decontamination.

Contributors to the Combined Joint CBRN Defense Task Force

Some 21 NATO countries contribute to the Task Force on a voluntary basis. National commitments vary depending on the rotation, but there are usually between 8-10 countries involved per rotation.

In 2010, a non-NATO member country participated for the very first time. Ukraine contributed a decontamination platoon after having accomplished a NATO evaluation and certification process.

Working mechanisms

The CBRN Joint Assessment Team and CBRN Defence Battalion fall under the strategic command of the Supreme Allied Commander Europe (SACEUR). Operational control is delegated to a subordinate command as required.

Allied Command Transformation (ACT) provides evaluation standards, supports training and determines future NBC defence requirements and develops capabilities.

The Battalion-level organisation is composed of personnel from a number of NATO countries, on stand-by for 12-month rotations. Like the NATO Response Force (NRF), dedicated personnel are based in their countries, coming together for training and deployment.

A voluntary lead country is identified for each rotation. The lead country hosts the CBRN Joint Assessment Team and Battalion headquarters, responsible for command and control arrangements, maintaining standard operational procedures, sustaining readiness levels and for planning and conducting training. Contributing countries supply functional capabilities. This includes providing requisite troops, equipment and logistical support in accordance with mission requirements. The Task Force consists of separate but complimentary components, which can be deployed in different stages and different combinations to suit each mission.

The components are:

- **Joint Assessment Team.** Specialists that provide CBRN-related advice and support;
- **Headquarters Command and Control.** Tailored command and control capabilities with a robust communications package to support assigned and attached organisations;
- **Reconnaissance.** Designed to provide route, area and point detection and identification of agents;
- **Decontamination.** Maintains the capability to decontaminate personnel and equipment;
- **Deployable Analytical NBC Laboratories.** Designed to provide expert sampling, analysis, and scientific advice to support operational commanders.

The Battalion has a close relationship with the NRF. While it can be deployed independently, it is consistent and in complimentarity with the NRF. Its strength is included within the NRF force structure, and it can deploy within 5 to 30 days.

Evolution

Following the agreement at the 2002 Prague Summit to enhance the Alliance's defence capabilities against WMD, the NAC, in June 2003, decided to form a multinational CBRN Defence Battalion and Joint Assessment Team.

The structure of the Battalion was established at a planning conference on 17-18 September 2003. On 28 October 2003, a force generation conference was held at Supreme Headquarters Allied Powers Europe (SHAPE), Mons, Belgium. On 18-21 November 2003, a follow-up conference was held in the Czech Republic, the first volunteer lead country.

The Battalion reached its initial operational capability on 1 December 2003. Full operational capability was achieved on 28 June 2004 as declared by SACEUR at the Istanbul Summit, and responsibility was transferred to the strategic command of Allied Command Operations. From then on, the Battalion was included in the rotation system of the NRF. The concept of operations and capability requirements of the

Battalion are currently being reviewed to incorporate lessons learned from previous NRF cycles and operational deployments.

Chemical Threat Detection for Safety and Security

Source: http://www.blockeng.com/applications/security.html

For decades, Block's standoff infrared detection products have been used to protect critical infrastructure in the National Capital Region and elsewhere. New developments in Quantum Cascade Laser (QCL) technology are now allowing Block to offer breakthrough increases in sensitivity, speed, and detection distance.

Block Engineering's **LaserWarn** is an open-path chemical detection system that was developed to save lives and protect personnel from chemical attacks. The system is designed to protect transportation facilities, embassies, military bases, government buildings, malls and other vulnerable critical infrastructure. LaserWarn identifies Chemical Warfare Agents (CWAs), Toxic Industrial Chemicals/Materials (TICs/TIMs) and other hazardous chemicals.

The LaserWarn system can detect chemical threats — including Sarin, Tabun, VX, and Cyclosarin gases — in parts-per-billion (ppb) ranges from standoff distances of hundreds of meters. The system registers warnings in seconds, allowing for rapid response to threats.

For examples of how LaserWarn can protect building/campus perimeters, transportation hubs (airports, subways, train stations), and stadiums, please **click on the following** to expand:

The LaserWarn can be permanently installed for security monitoring of buildings, hubs, and large-capacity crowd venues — or it can be carried as a lightweight, portable system for First Responders.

Chemical	Estimated Limit of Detection (100m path)
Sarin	26 parts per billion
Cyclosarin	26 parts per billion
VX	26 parts per billion
Cyanogen Chloride	5435 parts per billion
Phosgene	67 parts per billion
Nitric Acid	153 parts per billion
Ammonia	84 parts per billion
Chlorine (as HCLO)	261 parts per billion

In permanent installations, the system is set up with a series of low-cost mirrors and retro-reflectors. Eye-safe lasers create a detection path that blankets the area of interest. When a gas cloud crosses that laser path, a detection is sensed and a signal sent to the building control center. The system operates 24/7, and unlike conventional networks of point sensors, the LaserWarn requires no regular maintenance or specialty cooling methods. False alarms can be eliminated because the system collects background information continuously as a function of time of day, day of week, and season so it is not confused by typical background chemistries. The system is designed for both indoor and outdoor operation.

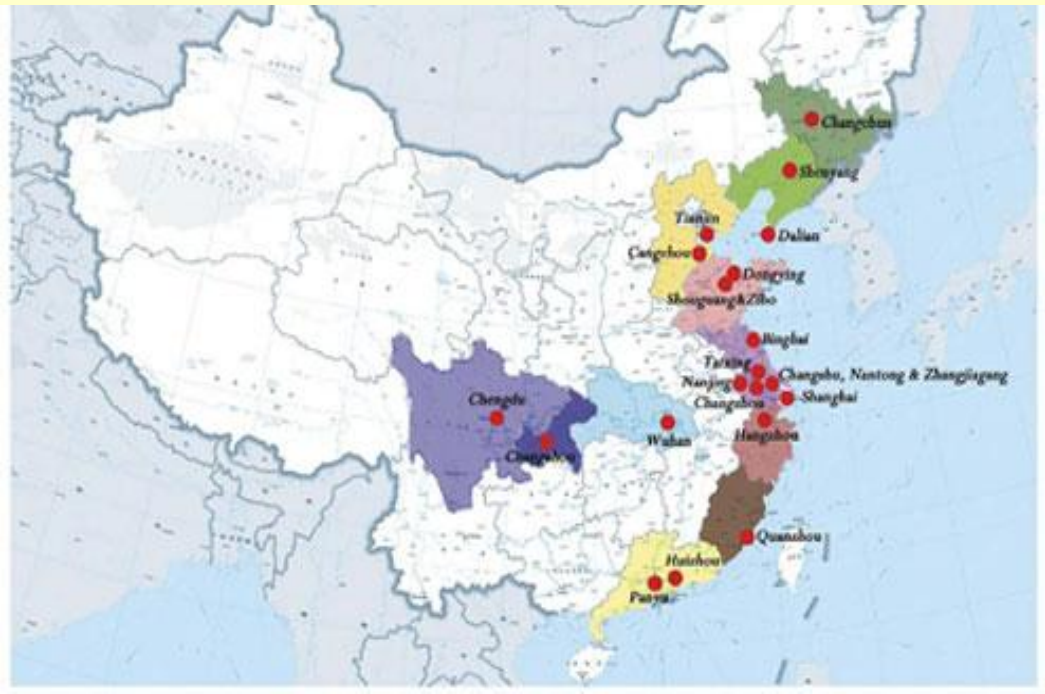
In portable applications, the system is hand-carried to a target location. First Responders introduce reflectors into the

"hot zone" and the target area can be tested for chemical contamination from a safe distance. The LaserWarn can be quickly mounted or dismounted from a standard tripod for maximum flexibility.
The LaserWarn standard detection range is a 500 meter round trip path, with extended ranges of up to 3 kilometers possible with larger collection optics. Utilizing QCL-based infrared absorption spectroscopy technology, the system provides rapid response times of 1 second or less.
LaserWarn can easily interface with most security systems via ethernet, wireless, or cellular communication methods. Compared to existing IR and FTIR open-path detection systems, the LaserWarn offers significant improvements in speed, sensitivity, detection distance, and ease-of-use.

Nearly 1,000 Chinese chemical plants to relocate in wake of Tianjin explosions

Source: http://www.homelandsecuritynewswire.com/dr20150831-nearly-1-000-chinese-chemical-plants-to-relocate-in-wake-of-tianjin-explosions

Aug 31 – **Local governments across China have submitted plans to relocate or upgrade about 1,000 chemical plants in the wake of the massive explosions in Tianjin earlier this month, which killed 147 people.**
The blast at a warehouse in which large quantities of chemicals were stored was China's worst industrial accident in recent years.



Criticism was voiced about locating a storage facility for volatile and toxic chemicals right next to densely populated residential areas, and about lax safety monitoring which allowed the company operating the facility to store the chemicals on site without proper license.
Miao Wei, China's industry minister, said local governments were moving in a more determined fashion to relocate and upgrade chemical plants.
"We started to work with State Administration of Work Safety last year to make arrangements for the relocation and revamping of chemical plants in densely populated urban areas. Frankly, our work is not actively supported locally in the past year," Miao told the Communist party-run *People's Daily* newspaper.
The Department of Industry said that **about 1,000 chemical plants need to be relocated or upgraded at a total cost of around 400 billion yuan ($62.6 billion).**

Chinese chemical industry parks

Miao told the paper that local government and the companies involved would have to take care of part of the cost while central government would provide support. He said he wanted to "accelerate the relocation and revamping," which would help to improve pollution and emission levels.
The *Guardian* reports that two powerful explosions destroyed a warehouse at the port city of Tianjin on 12 August. Authorities

have said up to forty types of chemicals were at the warehouse, including large quantities of sodium cyanide. Government regulations bar such facilities from being located closer than 0.6 miles from public places, transport hubs, or residential areas.
Critics charged that at least two other companies which handled flammable and toxic chemicals were operating in the same area, and that their storage facilities were less than a mile away from a school and a residential area.
Chinese health authorities said that the levels of sodium cyanide in several reservoirs in Tianjin were up to ten times higher than allowed, and urged the city's resident to use bottled water until the level of the toxic chemical subsides.

The Growing Threat Of CBRN Weapons – Analysis

By Weimeng Yeo
Source: http://www.eurasiareview.com/03092015-the-growing-threat-of-cbrn-weapons-analysis/

Sept 03 – Chemical, biological, radiological, and nuclear (CBRN) weapons attacks constitute a sizeable portion of terrorism risk. This risk has become a growing concern as there is evidence that the insecurity in the Middle East has emboldened terrorists groups to acquire and develop such weapons.
The current instability in the Middle East, particularly in Iraq and in Syria, may have shifted the paradigm about the use of chemical, biological, radiological and nuclear (CBRN) weapons by terrorist groups.
In the past, there has been a consensus among counter terrorism experts that the use of a CBRN weapon by terrorist groups is unlikely as these armaments were expensive, difficult to acquire, complicated to weaponise as well as to deploy. Moreover, with the operational environment being curtailed by national security agencies, counter terrorism experts agreed it would be a challenge for any terrorist groups to orchestrate such attacks, particularly in the West. There are at least five reasons for this apparent shift.

Driving forces of possible shift
Aspiring terrorist groups: The conflict in Syria and the insurgency in Iraq have energised the salafi-jihadi groups and have emboldened their supporters to orchestrate large scale high-casualty attacks. More worrying is the fact that salafi-jihadi groups have been linked to several CBRN terrorist attacks. Horrific images and witness accounts have led to allegations that militants have used chemical weapons against Kurdish militants in Syria and security forces in Iraq.
In Iraq and Syria, the strongest salafi-jihadi group is Islamic State (IS). Apart from its ideology, and an even more virulent view of jihad than that of its Al Qaeda counterpart, IS with more than 30,000 fighters has shown willingness and capability to orchestrate successful large-scale attacks overseas. Counter terrorism experts have warned that IS has been working to build up capabilities to execute mass casualty attacks outside their area of operation, a departure from the group's focus on encouraging lone wolf attacks.
Access to financial resources: IS has access to extraordinary levels of funding that make the procurement of supplies to develop CBRN agents a smaller hurdle to overcome. According to a study by Reuters in October 2014, with the resources generated by IS-controlled territory and the income collected from their illegal activities such as kidnapping, extortion and smuggling, **it is estimated that IS possesses assets of more than US$2 trillion, with an annual income amounting to US$2.9 billion.**
While this is a conservative estimate and much of their financial resources would be allocated to run their organisation as well as maintain control of their territory, it still offers them ample funding to have a credible CBRN programme.
Increased number of safe havens: A failing state can offer a safe haven in which militants can function freely and shelter from authorities seeking to disrupt their activities. IS gains in Iraq and Syria have provided it the safe havens in which they have the capacity to develop such weapons. Currently, IS has control of almost 50% of Syria and has seized much of northern Iraq, including the major city of Mosul. Thus, members of the militant group are not merely fighting on

the front lines but they also have authority over substantial swath of territory in both Iraq and Syria. The fear is that there are people working in IS-controlled campuses of the University of Mosul or in some CBRN facility in the Syrian city of Raqqa, the group's de facto capital, to develop such weapons.

Accessibility of CBRN arsenal: Despite commendable efforts by the Organisation for the Prohibition of Chemical Weapons (OPCW) to render Syrian CBRN stockpiles obsolete, it is still unclear whether the Assad regime has destroyed its CBRN arsenal. As such, access to CBRN materials in Syria is still a concern as there are many potential CBRN sites that could be pilfered by a terrorist group. For example in April 2013, militants targeted the al-Safira chemical facility, a pivotal production centre for Syria's chemical weapons programme.

Role Of foreign Jihadists: The role played by the foreign fighters who have travelled to Syria and Iraq in the past few years also needs to be taken account. IS' success in attracting foreigners has been unparalleled with **more than 20,000 individuals joining their group. Several of these foreign jihadists have attended universities, providing IS a pool of individuals with the requisite scientific expertise to develop and use CBRN weapons.**

To illustrate this point, in August 2014, a laptop owned by a Tunisian physics university student fighting with IS was discovered to contain a document on how to develop bubonic plague and weaponise it. Many in the counter terrorism field have concerns that individuals with such a background could be given a CBRN agent and then be trained to orchestrate such an attack. With their training, they might even return to their countries of origin to conduct attacks back in their homeland.

Growing interest to acquire CBRN arms

The interest in acquiring a CBRN weapon by terrorist groups remains unabated. There is enough information to show that IS has at least a nascent CBRN programme. Fortunately, obtaining a CBRN capability to kill hundreds, much less thousands, is still a major challenge. Al-Qaeda in the past has tried to acquire such weapons with limited success while the counter terrorism forces globally have devoted significant resources to prevent terrorist groups from making any breakthrough.

Current evidence suggests that the salafi-jihadists are still unable to orchestrate a mass CBRN attack, and at best can produce crude CBRN agents that are more suited for smaller attacks. As a result, terrorist groups will continue to resort to conventional attacks. However, at the same time, with its sizeable financial resources, success in recruiting skilled individuals and the availability of CBRN materials in Iraq and Syria, IS has increased its probability of carrying out a massive CBRN attack. As it is not "if," but "when" before a mass CBRN attack could occur, counter-strategies must be put in place.

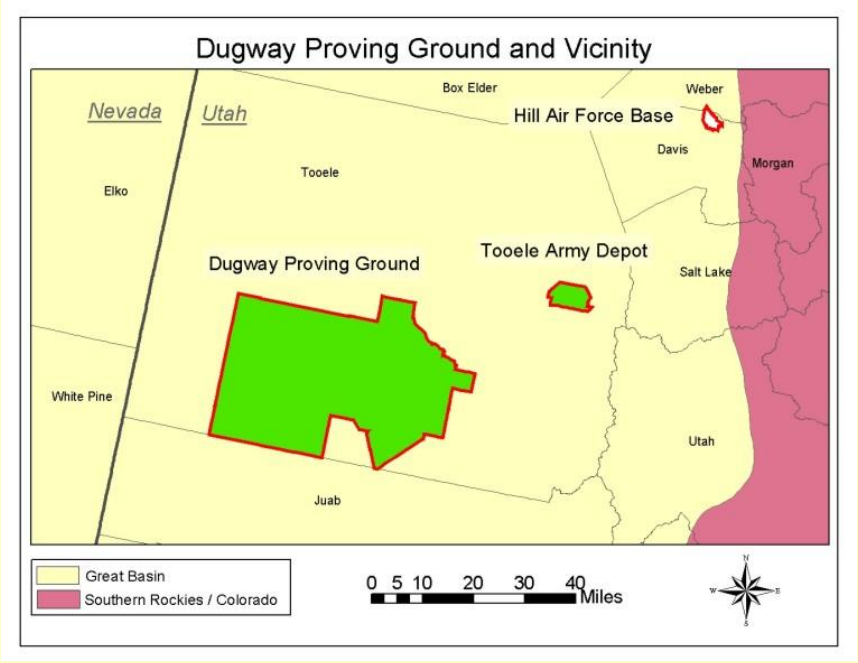
Weimeng Yeo *is a principal modeler at Risk Management Solutions (RMS) for the development of RMS' terrorism modeling solutions. He was previously with the International Centre for Political Violence and Terrorism Research (ICPVTR) a unit of the S. Rajaratnam School of International Studies (RSIS) Nanyang Technological University, Singapore. He contributed this specially to RSIS Commentary.*

Plumes of chlorine gas to be released on Dugway testing grounds

Source: http://www.deseretnews.com/article/865635781/Plumes-of-chlorine-gas-to-be-released-on-Dugway-testing-grounds.html?pg=all

Aug 31 – The U.S. Army's Dugway Proving Ground is working with the Department of Homeland Security this week for 5- and 10-ton releases of chlorine gas — a chemical that could be deadly if inhaled in high concentrations.

The test series, deemed **Jack Rabbit II**, is meant to simulate a large-scale chlorine gas leak so emergency response teams better understand how the chemical behaves in large quantities and know how to act if such an incident were to take place.



Millions of tons of toxic chemicals such as chlorine are transported each year through urban communities in massive quantities, including 90-ton rail cars and 20-ton tanker trucks, so the threat is imminent, said Shannon Fox, Jack Rabbit II program manager and lead scientist for the Department of Homeland Security.

If the pressurized tanks are punctured, the liquid chlorine would emit in thick, green plumes that could severely corrode metal and burn skin and lungs upon contact, Fox said Monday on KSL Newsradio's "The Doug Wright Show."

"It is scary, but that's why we're trying to understand it so we can be proactive," he said. "Domestically, we don't have any indications that there's a concern. However, we prepare for it. We take it very seriously. … We're invested in saving lives, no matter what the source."

The simulations, which started last week and will continue until the end of next week, are the largest tests of their kind at the Dugway Proving Ground, said Damon Nicholson, Dugway program manager. It's also the first test program to study the chemical's effect on buildings and vehicles.

In 2010, the grounds conducted a similar test series, Jack Rabbit I, with 1- and 2-ton releases of ammonia and chlorine. Fox said officials realized from those tests that they needed to experiment on a larger scale to validate what computer hazard models were predicting.

"We're kind of flying blind until we actually do the test and figure out the way it's actually going to behave," Fox told the Deseret News.

The testing is safe, he said, because it is taking place on the Salt Flats nearly 40 miles away from communities where there is little animal or plant life.

Nicholson said officials have been trying to flush birds out of the area before each test.

"Right now we're pretty confident that we're being as low impact to the environment as possible," he said.

Fox said both 5- and 10-ton plumes were already released in three experiments last week, and detectors placed 7 miles away only sensed a slight amount of chlorine.

"By the time it goes another 30 miles away, there's essentially nothing left," he said, adding that chlorine, as a fast-reacting chemical, does not present a lingering hazard. "When it reacts, it becomes chloride, which is safe — essentially salt — so there's no long-term contamination. Once it's gone, it's gone."

But some groups worry about the experiments' impacts. Brian Moench, president of Utah Physicians for Healthy Environment, said Utahns should pay close attention to the tests.

"We endorse the intent of the chlorine tests, but given the tragic mistakes and very troubled past of the government's testing of radiation and other toxins in the Great Basin over the last 60 to 70 years, Utahns should maintain a healthy skepticism about the safety of these tests," Moench said, pointing to the 2007 proposal to drop the "Divine Strake" bomb in Nevada.

Dugway was also testing nerve gas in 1968 when thousands of Utah sheep in Tooele County began dying, he said. A 1970 report by Maryland researchers said there was "incontrovertible" evidence that a nerve gas killed the sheep, but the U.S. Army has not acknowledged that the Dugway testing was to blame.

"We think they should release to the public all the data they have to show these chlorine tests would be safe, rather than expecting the public to take their word for it," Moench said.

Nicholson said the tests are being conducted within safety restrictions mandated by the Utah Division of Air Quality, which set wind direction and speed requirements so the gas isn't blown too far away.

"We went through a detailed permitting process with them," said Marty Gray, division permit manager. "All the studies show that these releases won't result in an off-site plum, and there's monitoring in place to verify that. And if they do see any concentrations of chlorine in their monitors, they report it to us."

Gray said when the testing was proposed last year, air quality officials put the permit up for public comment for 30 days, but no one requested a public hearing.

"We got a few comments on it, but we were able to address them without having to make changes," Gray said.

More tests are scheduled for Tuesday, Thursday and Friday, as long as weather cooperates, Fox said.

There have been several accidents over the past 20 years resulting in chlorine releases in the U.S, according to a Dugway news release.

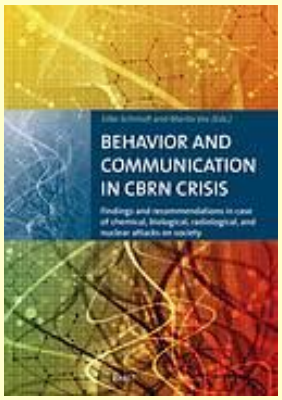
One of the worst incidents in the country occurred in 2005 when 18 freight cars derailed in Graniteville, South Carolina, and about 120,000 pounds of chlorine gas was released. Nine people were killed, about 550 were hospitalized, and at least 1,400 were exposed.

According to the federal government's Hazardous Substances Emergency Events Surveillance database, chlorine incidents occur in the U.S. at least once every few days, and one-third of the incidents cause injuries.

Read more on Rabbit I chlorine drill at:
http://ares.lids.mit.edu/fm/documents/rabbit_chlor.pdf

BEHAVIOR AND COMMUNICATION IN CBRN CRISIS – Findings and recommendations in case of chemical, biological, radiological, and nuclear attacks on society

By Silke Schmidt and Marita Vos (Editors)
Source: http://www.psychologie-aktuell.com/buecher/einzelansicht/article/1434544008-behavior-and-communication-in-cbrn-crisis-findings-and-recommendations-in-case-of-chemi.html?tx_ttnews[backPid]=143&cHash=91673bb683



Terrorism is an ongoing threat to modern societies. Major terror incidents in the last 25 years such as the World Trade Centre attack in 1993, the Oklahoma City bombing 1996, the Madrid bombings 2004, the London underground and bus bombings 2005, the Turkish bombing campaign in 2006, the Oslo bombing in 2011, and the Boston bombing in 2013 were conducted with conventional explosives. Chemical, biological, radiological, and nuclear weapons of mass destruction are rarely in the focus of terrorism (CBRN Terror). Single incidents like the Tokyo subway sarin attack in 1995, however, show that CBRN terrorism is a threat with serious consequences to be prepared for. One important aspect in a CBRN crisis is to inform and communicate with the general public about the incident – in order to make them aware of potential dangers but also to prevent unjustified rumours. Results and recommendations presented in this book provide suggestions and information to communication experts in the field of CBRN.

2015, 172 pages, Hardcover, ISBN 978-3-95853-033-1, price: 25,- €

"An adequate and timely response to a major chemical, biological, radiological or nuclear incident, whether it is of industrial or malevolent origin requires preparation, exercising and drilling in addition to a built up trust between crisis managers and members of the public and above all the media. This book represents a true effort in building up this trust by elaborating on and providing communication guidelines that, if implemented in an appropriate way, will truly improve crisis management and communication among stakeholders."
Carlos Rojas-Palma, Ph.D. Senior Project Manager Security Research, Belgian Nuclear Research Center (SCK•CEN)

Source: http://www.cwccoalition.org/wp-content/uploads/2014/12/ARgIQ-dual-use-chemicals-OF-2014.pdf

Source: http://www.cwccoalition.org/wp-content/uploads/2014/12/MJA-Crowley-presentation-to-Open-Forum-slides-021214.pdf

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, OR NUCLEAR (CBRN) DETECTION: A TECHNOLOGICAL OVERVIEW

LORD JOPLING (UNITED KINGDOM)
SPECIAL RAPPORTEUR

Source: http://www.nato-pa.int/default.asp?SHORTCUT=669

I. INTRODUCTION

1. In the past various terrorist groups have employed or threatened to employ chemical, biological, radiological or nuclear (CBRN) agents. However, despite widespread publicity about the threat, there have been few actual attempts by terrorists to cause mass civilian casualties using CBRN agents. Exceptions have been the salmonella poisoning of 751 people (no fatal cases) by the Rajneesh sect in Oregon, USA in 1984; and the various attempts by the Aum Shinrikyo in Japan to use both chemical and biological agents, the most "successful" of which resulted in June 2004 in seven dead and 200 hospitalised in Matsumoto, and 12 dead and 1,000 hospitalised in Tokyo. Unsubstantiated threats have been far more common, hoaxes or relatively low-level incidents causing few, if any, casualties.

2. There have also been a small number of attacks on nuclear power facilities worldwide; numerous unsubstantiated threats to trigger nuclear explosive devices; and at least one reported case of radiological materials being used by terrorists to a very limited degree when Chechen rebels planted a cesium capsule in a park in Moscow.

3. However, as information and capabilities become progressively more widespread via the Internet etc, it is becoming increasingly difficult for the authorities to distinguish between a mere hoax and the real thing. This raises a number of difficult questions about the appropriate responses to such threats, which not only have the potential to be extremely disruptive to normal, day-to-day activities, but also may provide individual terrorists and terrorist groups with a potent instrument against society, even in the absence of a real capability or willingness to carry out an actual attack. In any event, an attack using unconventional weapons would certainly cause serious economic and social disruption. According to a recent study by the Organisation of Economic Co-operation and Development (OECD), the cost of a single attack could range between $50 billion and $250 billion.

4. Governments and the general public alike view the potential threat of CBRN weapons being in the hands of terrorists with growing concern. In the autumn of 2001, the anthrax attacks in the US started the warning bells ringing. Recent terrorist attacks directed at public transportation in Madrid or in London brought the threat to Europe and signalled the

need to prepare for an even worse scenario in Europe too. At the end of August, information regarding plans by an Al-Qaeda cell to carry out a sarin gas attack on the British House of Commons, and an incident in May 2004, when condoms full of purple flour were thrown at Prime Minister Tony Blair during a Question and Answer session in the House, highlighted the vulnerability and lack of preparedness of national parliaments.

5. All these incidents crudely demonstrate the crucial need to understand the extent of the threat and to adopt adequate measures. The question is, how easy would it be for an individual terrorist or terrorist group to manufacture or to obtain such weapons, and yet more importantly: how easy would it be for such weapons to be delivered, dispersed or used?

6. At all levels governments have been prompted to reconsider their readiness, resources, and capabilities to mitigate the impact of those threats to society. Several international initiatives adopted in recent years have also contributed towards a global awareness of potential threats. At the Kananaskis Summit in Canada in June 2002, G8 countries adopted a "Global Partnership Against the Spread of Weapons of Mass Destruction", committing themselves to spending up to $20 billion over 10 years on preventing terrorists, or those who harbour them, from acquiring or developing CBRN weapons, missiles, equipment, technology and related materials.

7. The 2003 report on "Civil Protection: a general overview" by Ms Wohlleben (Germany) assessed general threats and policy approaches, and as a follow-up to this, this year Rapporteur Lord Jopling (United Kingdom) decided to focus upon the means available to detect potential CBRN threats. Despite the fact that recent events, such as the tsunami in Asia, hurricane Katrina in the US and the avian flu pandemic have focused public attention upon natural disasters and emergencies, your Rapporteur strongly believes that these events should not divert efforts away from the equally serious threat of CBRN terrorism, especially as improved CBRN detection mechanisms could enhance civil protection capabilities in general, and further protect us from natural disasters.

8. A Committee visit to the US in September 2005 provided valuable insights for this report and your Rapporteur would also like to thank the British and American delegations for their valuable input to this report.

9. After general considerations of the detection of CBRN terrorism, this report will review the technology currently available for detection of each kind of weapon, as well as the general orientation of related Research and Development.

II. GENERAL CONSIDERATIONS ABOUT THE DETECTION OF CBRN THREATS:

10. Detection mechanisms are a fundamental aspect of any successful CBRN civil protection policy. Generally speaking, detection aims at establishing the release or presence of a CBRN agent in a given area/location. Detection is usually associated with prevention. In reality, detection mechanisms are needed at the three stages of a CBRN incident, i.e. before, during and after. Before an incident occurs, CBRN detectors allow for continuous monitoring to either prevent a CBRN incident or to allow for early warning in the event of its happening. These two options are sometimes referred to as detect-to-protect and detect-to-treat. During the incident, detectors are required on the spot in order to allow first responders to identify the precise nature and extent of the release and to organise the response accordingly. Lastly, once the incident has occurred, detectors are indispensable in order to confirm the results of early identification, collect evidence and confirm that the area has been decontaminated. Monitoring, warning, identifying and consequence assessment are thus all core functions of detection. In other words, detection contributes to at least four of the main objectives of civil protection, i.e. prevention, protection, response and recovery.

11. However, detection does not provide a comprehensive and perfect solution in any of these cases. Efficient civil protection requires a holistic approach, of which detection is only one component, along other policies and actions. The difficulty is that in most countries, there is no one overarching and supervising institution in charge of civil protection. The US, with their Department of Homeland Security, is in that sense rather an exception.

12. Co-ordination and integrated efforts and policies are thus among the central challenges to effective adaptation of civil protection policies. They are also crucial in terms of detection. As mentioned above, detection is required at all different stages of an

emergency. Detectors also tend to employ "dual-use technologies" that can be useful medical and industrial tools as well as in the field of homeland security. Finally, and maybe most importantly, co-ordination is needed because detection mobilises multiple other policies (intelligence, R&D, health, energy, foreign policy, etc.) and stakeholders (government departments, local administrations, first responders, academic community, industry, international organisations, etc.).

13. Therefore detection should not merely be considered a technological issue. It is also political and involves priority setting, assessment of needs, threats and capabilities and a balancing of competing objectives. It is fundamental to find a balance between both security needs and budgetary constraints, and security and the protection of human rights and individual freedom. For example freedom of trade is affected when detectors are installed at departure ports or entry ports and slow down the free flow of trade. Privacy is also reduced when technology such as video-surveillance or biometrics are used for counter-terrorism purposes.

14. A genuine detection policy would entail guidelines regarding the development, deployment, use, assessment and adaptation of detectors.

15. Regarding the development of detectors, governments need to define: 1) what detectors are needed for, i.e. the threat they should detect and their objective; i.e. should they aim to detect the threat in time to prevent an attack (detect-to-protect) or should they only allow for early warning once the threat is real (detect-to-treat); 2) who will use the detectors: civilian or military personnel; experts - lab technicians - or novice users - first responders; 3) who will develop them and with which financial resources, i.e. public programmes / public funding, public-private partnerships, civilian-military partnerships.

16. A detection policy also needs to define guidelines for the deployment of detectors. Critical infrastructure must be identified and monitored for the presence of CBRN agents (government buildings, public transportation facilities, postal sorting offices, water supplies, chemical and nuclear plants, etc.). The policy must be applied nationwide, especially in the case of environmental monitors.

17. Furthermore, a concept of use of the detectors also needs to be developed, i.e. the detectors' properties and the ways in which generated data will be interpreted and used in decision-making. In particular, this means that a proper chain of command and control must be clearly identified to decide upon the information generated by detectors.

18. Finally, policies should be adopted to allow for the validation of detectors, the assessment of their performance and their adaptation. Validation means an official authority would ensure that privately produced detectors meet all specifications. As the Committee learned during its visit to the Port Authority of New York New Jersey (PANYNJ), such controls are fundamental, as tests conducted by the Department of Homeland Security's Office of Systems Engineering and Development in partnership with the PANYNJ have demonstrated that only a limited fraction of the broad range of commercially available detection devices meet manufacturer's advertised claims.

19. Adaptation of detectors is also a critical challenge. Most existing technology is flawed and no one country can claim full territorial or infrastructural coverage. The risk is that partial deployment of imperfect technology would create a false sense of security. Nevertheless, the recent and growing focus on CBRN threats has led to technological advances in all categories of detectors and new technology is constantly being developed and tested.

20. Detectors currently on the market differ according to the agent they are intended to identify. The objective of having an all-purpose detector is still a fairly unrealistic prospect. Detectors also differ in their mode of operation; the main distinctions are between standoff and point detection, and between fixed and hand-held detectors. Today's detection devices include various combinations of these characteristics. Stand-off detectors are stationary systems or mobile units designed to monitor large areas remotely. Point detection refers to hand-held devices which can be pointed at a suspect area or be a point source for detection. Fixed detectors are installed, automatic instruments designed to be used at checkpoints or critical facilities to monitor a continuous flow of persons, vehicles, luggage, cargo, or air samples. Hand-held devices are lightweight instruments, which can be used to detect, locate and sometimes identify a CBRN agent.

21. The choice between these different types of detectors is usually dictated by considerations regarding the purpose of the detector. In other words, detectors must be adapted to their intended purpose. Fixed detectors are ideal when nodal points or critical

infrastructures can be identified as they are most highly sensitive. Hand-held instruments are particularly useful in widely dispersed areas such as airports or seaports, or in targeted search situations.

22. Detectors also differ as to their key function: simple warning when the presence of an agent is detected; identification of the agent (this is a more complex function, which sometimes requires scientific reach back, for example laboratory analysis); mapping/localisation/assessment of the contamination (a capacity some hand-held detectors have). The current drive is towards the development of new, cheaper, easier-to-use, hand-held, highly sensitive detectors, combining different types of technology to both detect and identify CBRN agents, whilst routinely covering large areas.

23. However, as mentioned above, one important question is how affordable these technologies are and what budget governments can and will dedicate to the detection of CBRN terrorism. Although it is sometimes difficult to obtain precise figures, some indicators indicate current spending trends in two leading countries in this field. The United States' effort is certainly the greatest. According to a recent New York Times article, since 9/11 the US has spent more than $4.5 billion on screening devices to monitor the nation's ports, borders, airports, mail and search for guns, explosives, nuclear and biological weapons. The US President requested an overall budget for homeland security of $47.4 billion in fiscal year (FY) 2005. In comparison, the UK's overall spending on counter-terrorism and resilience has increased from £950 million (US$1,6 billion) in 2001, to £1.5 billion (US$2.6 billion) in 2004 and by 2007-2008 this is expected to become £2.1 billion (US$3.6 billion). The research and development (R&D) budget is also a good spending indicator. In the US, the Department of Homeland Security's R&D budget for anti-terror technology should amount to $1 billion in FY 2005. In the UK, the Home Office's CBRN Science and Technology Programme is financing R&D projects to improve terrorism preparedness capabilities. It launched a bid for projects in January 2005 and will finance short-listed projects of an approximated value of £10 million (US$17 million), part of which will finance the development of new detection technology. The bidding process will be repeated every year.

24. These general considerations need to be kept in mind while presenting and assessing CBRN detection technology in use at present. Confronted with a changing threat, our societies must adapt their efforts constantly. Detection mechanisms should also be adapted. How this is done will depend upon the priorities set by each individual society and consequently upon their capabilities. The overview of CBRN detection technology provided in this report is intended to assess efforts made to date. Your Rapporteur also hopes it will foster knowledge of and promote dialogue on how, to which extent and with which limitations, detection technologies can help ensure that our societies are prepared for the worst.

III. CHEMICAL AND BIOLOGICAL THREATS: DETECTION MECHANISMS

25. There have recently been reports of new or renewed interest in obtaining chemical and biological weapons being shown by a number of traditional, international terrorist groups. Senior US government officials have publicly asserted that the terrorist financier Osama bin Laden has been actively seeking chemical, biological, and nuclear weapons for use against Western targets. The WMD Terrorism Research Program at the Monterey Institute keeps a listing of reports on al-Qaeda's involvement with CBRN weapons between 1997 and 2004, which currently contain about 80 entries. Although the authors themselves admit that the reliability of sources varies, the mere existence of such a table is in itself alarming. The recent apparent resurgence of the Aum Shinri Kyo in Japan is also troubling, given the technical knowledge of some of its remaining followers, and the possibility of yet-undiscovered stocks of CB agents or precursors.

26. The ideal chemical or biological sensor would fulfil a host of criteria. It would be inexpensive, easy to use, rapidly deployable (hand-held), able to detect all dangerous pathogens, capable of detecting those pathogens in real time; able to detect them from diverse sample types. It woud be usable, 'stand-off' detection; and, most importantly, would always be correct.

27. The dangers of false-positives (detecting a non-existent threat) and false-negatives (failing to detect a real threat) are obvious. To guide policy-makers and reassure a concerned public, there must be faith in the equipment used. As technologies improve, so does sensitivity, increasing the likelihood of detecting naturally existing

microorganisms. Designers must balance the need for sensitivity with the danger of false alarms, with all the consequences they provoke.
28. To date a perfect sensor does not exist. A number of different technologies have been developed to detect chemical and biological agents, and technology is becoming increasingly innovative and sophisticated, but there are still flaws.

A. BIODETECTION
29. The US and Europe have become ever more concerned by the threat of bioterror. Whilst September 11 was a watershed in security assessments, the anthrax attacks on the US postal system in September and October 2001 served as an additional wakeup call, leaving 5 dead out of the 22 diagnosed cases, and the perpetrators were never caught. Early diagnosis certainly contributed to a reduction of the overall number of casualties, underlining the utility of detect-to-treat systems. However, more than 27,000 employees of United States Postal Services (USPS) had to be treated and clean-up costs of only two facilities amounted to $300 million.
30. In response, both sides of the Atlantic have explored how to detect a biological attack. The US effort has been the greatest with President Bush's launch of a new comprehensive initiative called "Biodefense for the 21st Century" in April 2004. According to one study, after September 11 the total US budget for civilian biodefense increased 16 fold, from $305 million in FY 2001 to approximately $5 billion a year for FY 2004, 2005 and 2006. The increased funding of biodefence research by the National Institute of Health's is even more striking. This experienced a 34 fold budget increase from FY 2001 to FY 2006. In comparison, the British government allocated £260 million (US$447 million) to bio-release countermeasures in FY 2003.
31. Biological agents attract terrorists because of their virulence, toxicity, transmissibility and lethality. They are relatively cheap to produce, sometimes readily available, and are also relatively easy to store and to transport. Moreover, besides naturally existing pathogens, terrorists could try to use engineered organisms. Experts believe that up to 1,000 toxins could be made of natural or genetic sources, although not all of them would be suitable for use as biological weapons. Pathogens are difficult to detect: they are colourless and odourless and have incubation periods, ranging from 48 hours for respiratory anthrax, to 21 days for Q-fever. This incubation period is both an asset and a challenge: an asset because it provides a window for quarantine and treatment of the victims and vaccination of others; a challenge because identification of the disease is often difficult. In early stages many diseases present flu-like symptoms and patients are thus likely to go on with their normal lives, which could cause widespread contamination in the case of transmissible diseases. Treatments and/or vaccines exist for most diseases caused by biowarfare agents (see information document 186 CDS 05 E). Timely detection of an attack is crucial to allow for the deployment of response mechanisms, including medical countermeasures.
32. "Detect to protect" biological detection technology is currently unavailable. Available instruments are usually large, slow and expensive. The more reliable the detection instrument, the longer it takes to identify the defined threat. Thus, the main goal of biological detection is to provide sufficient warning for responders to use the time to minimise casualties; in other words, the goal is to buy time.
33. Several technologies and tools exist, but individually they do not provide sufficient protection against an attack. Biodefense strategies thus tend towards the combination of several layers of detection. A first layer is composed of standoff detectors; a second layer of protection is provided by the use of point detectors; lastly, the collection of epidemiological data can support and complement the use of biosensors.
34. Sensor technology is the most obvious example of biodetection. The fundamental challenge is that biological agents have different properties and many sensors are pathogen-specific; each test must be tailored to recognise a specific pathogen. Moreover, in some cases, even a very small quantity of pathogen will cause disease. In those cases (as for example, in the case of the tularaemia pathogen, which requires as few as 10 organisms to infect), sensors need to be sensitive enough to detect even a minimal presence of pathogens.
35. If a biological attack were to be undertaken through the release of a biological agent into the air from a distance, advance detection would be a crucial asset to warn of the

attack and allow for an organised response. Early warning is the purpose of standoff detectors. Several technologies, such as Doppler RADARs, LIDARs (Light Detection and Ranging) or LIBS (Laser-Induced Breakdown Spectroscopy), can be used for standoff detection of biological agents. They rely on radio waves or light reflectance techniques to screen clouds for airborne pathogens. However, applications for these technologies are mostly military and their efficiency is still limited.

36. Recent developments in civil protection technology against bioterror focus on the development of new or more efficient point detectors to a far greater extent than standoff detection. The goal is to have detectors allowing for on-the-spot detection and identification of biological agents, where an attack is suspected to have occurred. JASON, an independent scientific advisory group providing defence science and technology consulting services to the US government, identified three broad types of biosensors in its 2003 study on biodetection, based on their mode of operation.

37. Environmental Monitoring refers to the continuous automatic monitoring of the environment in fixed locations. Sensors collect air samples that are then filtered, concentrated and analysed. Environmental monitors are not equipped for definitive identification of pathogens and in the event of detecting an abnormal presence, further tests are essential. Although relatively cheap, they are limited in the number of parallel tests they can perform at once. R&D in this area has focused mainly on detection of anthrax, because, unlike other pathogens, contamination by anthrax is only possible at relatively high levels of concentration. Airborne anthrax is thus comparatively easy to detect.

38. Sample Collection refers to the process of collecting and then analysing samples, either on the spot or in a laboratory. Filter paper is often used to collect the data. The sample is then submitted for a DNA-test intended to identify the biological agent used. Typically, polymerase chain reaction (PCR) is used as an identification procedure. Tests can result in very specific identification of pathogens, but this makes the system inherently less able to detect novel biological agents. Sample collection is also a labour-intensive and costly process. More effective detectors are currently under development, combining sample collection and on-the-spot PCR analysis.

39. The Biological Aerosol Sentry and Information System (BASIS) is a typical sample collection system. BASIS collects air samples at defined locations at specified time intervals, to help determine both the time and place of the release. Aerosol collection hardware continually collects, time-stamps, and stores samples. Samples then need to be transported to a fixed or mobile field laboratory for analysis. The samples are then submitted to the DNA-based PCR analysis for identification. BASIS devices were deployed in Salt Lake City, Utah, for the 2002 Winter Olympic Games.

40. The BioWatch initiative of the US Department of Homeland Security features elements of the BASIS technology but, unlike BASIS, BioWatch is deployed nationwide and, instead of using a mobile laboratory, uses laboratories that are part of the federal Laboratory Response Network, operated by the Center for Disease Control and Prevention (CDC). BioWatch was created in 2003 as a nationwide early warning system to detect rapidly the presence of select biological warfare agents in the air. It operates as a network of sample collection facilities, coupled to the network of pollution sensors deployed by the Environmental Protection Agency. BioWatch monitors are placed at key locations nationwide and operate around-the-clock. It currently covers strategic locations in more than 30 major cities.

41. The BioWatch programme was the first attempt at creating a large-scale network of bioterror detectors. However, it has been criticised for its high cost ($53 million in the first year of operation), limited coverage and for the choice of sensor location. As part of a new Bio-Surveillance Program Initiative announced by the Bush administration for FY2005, the Department of Homeland Security announced an overhaul of BioWatch in response to this criticism. BioWatch will receive $55 million in FY 2005, intended in part to modernise its detectors, extend coverage and start networking sensors and integrate them with other monitoring mechanisms.

42. In the United States, new technologies are currently being developed and tested with DHS funding and could be deployed to replace first generation BioWatch detectors. A second generation device is the Autonomous Pathogen Detection System (APDS) developed at Lawrence Livermore National Laboratory (within the US Department of Energy). The APDS can perform both detection and primary identification of at least 11 agents on the field. BANDs are other devices currently being tested (estimated cost: $25,000 or less). These are rugged, semi-autonomous detectors, able to identify at least 20 pathogens and toxins and detect as few

as 100 organisms, or as little as 10 nanograms of a toxin. They sample the air more frequently than current BioWatch detectors, test themselves internally and report on results every three hours of this initial screening. However, positive samples still need to be brought to a lab for a secondary inspection. The Rapid Automated Biological Identification System (or RABIS) presents many of the same features as the BANDs detectors. However its mode of operation is different: these detectors could be attached to building heating or air conditioning systems, detect biological agents in under two minutes and shut down ventilation in the event of a release. Since RABIS units are expected to be fairly expensive (the target price is $50,000 a unit), they would probably be limited to the protection of critical infrastructure, such as government buildings.

43. The US Postal Service's Biohazard Detection System (BDS), which was shown to the Committee during its visit to the US, also uses technology which combines sample collection with PCR-based DNA testing. Following the anthrax attacks of 2001, the U.S. P.S. installed biohazard detection devices (price per unit: $250,000) at 191 of its 282 mail processing facilities (complete coverage is expected by December 2005). This system screens mail for traces of anthrax. The BDS uses automated systems based on rapid on-site PCR analysis of aerosol samples collected during one of the earliest stages of mail processing. The equipment collects air samples as the mail moves through a stamp-cancelling machine. It absorbs the airborne particles into a sterile water base. The liquid sample is then injected into a cartridge, and tested for DNA match and the results are available on-site within less than an hour.

44. Most sample collection devices require that at least part of the identification process be made in a laboratory. Regular PCR procedures take time (usually 2 to 4 hours), are expensive, labour-intensive and require trained users. Moreover, DNA-based techniques cannot be used for detection of toxins, which have no DNA. New PCR or other amplification techniques are being developed to accelerate the process and improve the efficiency of the detection. Research into the miniaturisation of detection devices is also underway.

45. Mass spectrometry is an alternative technique for identification of pathogens. The technique is sensitive and efficient, but detectors are still bulky, expensive (prices range from $30,000 to $150,000 per unit) and require operation by trained personnel.

46. Rapidly-Deployable Sensors are mobile, often hand-held, detectors, which have the obvious benefit of being deployable to the area of a suspected incident. However, their usefulness is limited as they are often pathogen-specific and therefore unable to recognise a broad range of agents. Demands for reduced size and greater mobility also obviously affect the effectiveness of these machines. The Committee was surprised to hear from officials of the New York City Office of Emergency Management that the city has banned the use of such hand-held biodetectors by its responders due to their suspected inefficiency.

47. Basic and non-discriminatory sensors - that is sensors that cannot precisely identify the pathogens detected - include protein detection kits and Aerosol Particle Sizers (APS). Other basic and commercially available sensors are immunoassay kits or tickets with colorimetric indicators. Immunoassays are detectors that mimic the human body's immune system, based on antigens and antibodies. These sensors are cheap ($20 for each disposable test strip for example) and easy-to-use, but they are pathogen-specific, have high false-positive rates and a low level of sensitivity - i.e. they require more organisms to trigger detection than to infect. Similar tickets or hand-held devices which use DNA-based assays also exist.

48. An example of this type of DNA-based sensor is the Hand-held Advanced Nucleic Acid Analyzer (HANAA), developed at Lawrence Livermore. The system was designed for emergency response groups, such as fire fighters and police and is about the size of a brick. Each hand-held system can test four samples at once, either the same test on four different samples or four different tests on the same sample. HANAA can provide results in less than 30 minutes, compared with the hours to days that regular laboratory tests usually take. It uses the PCR technique to amplify agent-specific DNA fragments to a detectable level.

49. R&D efforts are currently directed towards the creation of field, miniaturised, lab-on-a-chip biosensors, which could be used on the spot by first responders. These sensors combine immunoassays, or DNA-based assays, with signal transduction on a chip to

provide direct and quantitative electronic readout. Such sensors would present a host of advantages: they would be cheap, easy-to-use, fast; and could integrate several functions in a single mass-produced device. Another version of these biosensors would involve using living cells from humans, animals or plants. The underlying idea of these cell biosensors is that the detector would respond to the presence of a biological agent just as the intended target would, but more quickly. They would also be able to detect novel engineered pathogens.

50. Beyond sensor-based detection systems, which remain an imperfect science as noted above, there are other means of improving a "detect-to-treat" biodetection architecture, based on the involvement of the health care community.

51. Hospitals and other medical services are likely to be the first institutions to identify the victims of a biological attack. Appropriate and timely responses to an attack might thus depend on accurate diagnosis of contaminated patients. Health care professionals thus constitute another layer of detection, their observations can either replace or complement results obtained through detection devices. The development of Syndromic Surveillance or Bio-Surveillance in several countries aims at making the best use of this crucial asset.

52. Syndromic surveillance refers to the process of collecting and analysing statistical data on health trends, particularly symptoms reported by people seeking care in health care facilities. By focusing on symptoms rather than confirmed diagnoses, syndromic surveillance aims to detect bioterror events earlier than would be possible with traditional disease surveillance systems (see timeline in information document 186 CDS 05 E). Syndromic surveillance systems regularly monitor a range of existing data for sudden changes or anomalies that might signal a disease outbreak. These data may include school and work absenteeism, sales of OTC products, calls to nurse hotlines, counts of hospital emergency room (ER) admissions or reports from physicians about certain symptoms or complaints.

53. Such systems are already used in both the US and the UK. In the UK, the National Health Service and Health Protection Agency run the programme called NHS Direct Syndromic Surveillance Project. NHS Direct is the only national syndromic surveillance system in England and Wales. It is a nurse-led telephone help-line, which provides health information and advice to 6 million callers a year. This network was originally created to improve detection of influenza outbreaks. In December 2001, it was expanded to provide an early warning for potential deliberate release of biological or chemical agents. It currently provides surveillance of 10 syndromes (cold/influenza, cough, diarrhoea, difficulty breathing, double vision, eye problems, lumps, fever, rash and vomiting). If any anomalies are detected from historical trends, i.e. exceedances, the system triggers a public health alert. The direct annual cost of operating the NHS Direct surveillance system is an estimated $280,000. This system is thus relatively cheap and is considered timely, representative and reasonably efficient.

54. In the US, the Center for Disease Control (CDC) runs the only national syndromic surveillance system, BioSense. This programme has received considerable funding since its creation in FY2003. President Bush's proposed 2005 federal budget included over $100 million for BioSense. Many cities and state public health agencies have also recently invested substantial funds into syndromic surveillance systems. For example, the New York City Department of Health and Mental Hygiene (DoHMH) runs one of the most advanced syndromic surveillance programme, at an estimated annual cost of $150,000, this including maintenance and routine follow-up of signals. This programme was presented to the Committee during its visit to the US.

55. Syndromic surveillance is considered an attractive tool to detect deliberate and naturally occurring disease outbreaks. It is relatively cheap, because it uses many existing networks and institutions and can serve purposes other than the sole detection of bioterrorism, such as the detection of influenza outbreaks. However, syndromic surveillance is also flawed. A recent study by RAND's Center for Domestic and International Health Security assessed the use of such surveillance. It recognised the inherent risk of false-positives and the chances of environmental distortion such as the flu season and concluded that, being a relatively untested methodology, health departments should be cautious about investing in costly new syndromic surveillance systems immediately.

56. Sentinel Organisms, meaning the use of animals and even plants for detection, offer another potential source of information. A dog, for example, has an olfactory (sense of smell) capacity that is four times larger than that of humans. In another example, the US

Army recently used pigeons in the invasion of Iraq as its first line of detection of chemical and biological agents since they are more sensitive to certain agents than humans. The potential in this area is broad and studies are currently underway to find a means of incorporating such detection into the overall architecture. These range from simple monitoring of veterinary data patterns to advanced bioengineering of plant cells to indicate the presence of certain agents.

57. Biological detection is probably one of the most challenging areas of CBRN detection. No currently available technology used alone is sufficient to protect a population. In the event of a deliberate disease outbreak, the availability of vaccines and treatment is thus crucial. Yet, faced with the relative scarcity of medical countermeasures for biowarfare agents, governments have adopted very different policies, particularly regarding stockpiles of vaccines and population categories which should receive routine vaccinations. In the U.S., the $5.6 billion BioShield programme aims at building large stockpiles of cutting-edge drugs, vaccines, and other medical supplies for biodefense, but implementation efforts have been recently scaled down.

B. CHEMICAL DETECTION

58. Hazardous chemical materials that may be used in attacks include chemical warfare agents, common toxic industrial chemicals, and special purpose chemicals. Fears of chemical terrorism usually focus on chemical warfare agents; these include blister agents (sulphur mustard or H and lewisite or L), nerve agents (GB and VX), blood agents (hydrogen cyanide or AC, cyanogens chloride or CK, and arsine or SA), and choking agents (chloropicrin or PS, chlorine or Cl2, and phosgene or CG).

59. Chemical weapons' detection has traditionally been a military matter and current detection capabilities have largely arisen from the military. Chemical agents are less difficult to detect than biological ones. However, current detection systems still fall short of the ideal needs for civilian detection purposes. They are either insufficiently sensitive, not mobile, or require a trained user.

60. A market survey of commercially available detection equipment conducted five years ago identified 148 detection devices available for the military and first responders. Typically prices range from $10,000 for hand-held detectors to $20,000 for fixed instruments. The following are some of the more widely used examples and none offer a perfect solution. First responders generally use chemical detection paper, or, in a few cases, ion mobility spectrometer (IMS) devices or combined IMS / surface-acoustical wave detectors for early warning. In the event of positive results, further confirmation is needed through the use of more sensitive lab technology, which takes between 6 and 48 hours. Gas Chromatography (GS) combined with Mass Spectrometry (MS) is the standard method of identification and quantification of chemical agents. Some mobile GC-MS exist and further efforts at miniaturisation are underway.

61. Colorimetric Indicators, based on enzymatic detection techniques, are at the most basic end of the chemical detection scale. They are available to first responders and are cheap, fast and simple to use. They contain an acid-base indicator that changes colour when exposed to specific agents in liquid or aerosol form. These indicators are highly prone to false-positives from various everyday substances, even smoke. They are essentially an early warning system that must be confirmed by further laboratory testing. The same colorimetric principle is also used in detection tubes, through which vapour or gas is pumped. They are agent-specific, requiring a different tube for every agent, chosen from a range of more than 160 substance-specific reagent tubes. Colorimetric detection tubes are nonetheless familiar to the first responder community, because of their low cost and simplicity of use.

62. The US military, as well as specialised HAZMAT teams, use M8 and M9 detection paper. M8 paper is blotted on liquids that arouse suspicion. It identifies agents by changing colour within 30 seconds of exposure. M9 paper has adhesive backing that allows it to be attached to clothing and equipment.

63. Ion Mobility Spectrometry is another means of point (hand-held) detection. It uses an electric field to recognise differences in the velocity of ions and has been miniaturised to the point that it is used in mobile detection without diminished resolution. Generally the response time is short, but dependent on agent concentration. IMS detectors typically cost around $10,000.

64. The Finnish M86 and M90, the Improved Chemical Agent Monitor (ICAM), or the APD 2000 all use IMS technology and are available to civilian first responders. They can detect

and identify the most common chemical warfare agents. Stand-alone detectors also exist, allowing for very precise detection and identification.

65. Surface Acoustical Wave Detection is a popular choice for first responders, due to the relatively low cost. It can also detect multiple agents simultaneously. These SAW devices use piezoelectric quartz crystals coated in polymers, which absorb certain chemicals. Using an array of sensors provides a response pattern that is unique to a chemical agent. The limit of this absorption process in turn limits the sensor's sensitivity, other molecules being inadvertently absorbed can also undermine the process.

66. SmallCAD is a lightweight, hand-held and battery operated chemical vapour detection instrument, combining IMS and SAW for higher sensitivity and lower false alarm rates. It can detect and identify a range of chemical agents and provide concentration levels in less than one minute. It is commercialised at a price of $30,000.

67. Mass Spectroscopy, usually used in conjunction with Gas Chromatography (GC-MS) involves breaking apart a molecule before accelerating the charged fragments and bending their paths in a magnetic field. Although highly sensitive and able to tackle mixed samples, the technology is not sufficiently small at present to be incorporated into mobile systems. It is also expensive and requires sample preparation before testing, which needs trained personnel. It is thus not used in detection systems available to civilian first responders. The accuracy of the technology is reflected by the fact that it is the method of choice for CWC (Chemical Weapons Convention) inspection on-site analysis.

68. Infrared Radiation is employed in various chemical agent detectors. Chemical agents each have a unique infrared fingerprint based on their vibrational wavelength. Passing infrared light through gases or vapours results in absorption of specific wavelengths of light. Infrared spectroscopy measures the quantity of light absorbed at given wavelengths in order to identify the agent. It can be used for standoff detection, usually in military applications, or point detection, which is more appropriate for use by first responders.

69. As well as these oft-used detection techniques, a host of others exist which all have various shortcomings in field or mobile usage. Examples include Flame Photometry, which burns a sample in a hydrogen flame and identifies it from the resulting emission, or Photoionisation, which uses ultraviolet light to ionise vapours or gases and then monitors the change in electrical current.

70. As this presentation of chemical and biological detection technologies has demonstrated, there is no one perfect or universal detector for biological and chemical threats and all existing detectors suffer flaws. Governments are thus faced with difficult choices as to their civil protection strategies. According to the JASON study mentioned above, ensuring blanket coverage of the whole population with detectors would be very expensive and not necessarily the most efficient strategy. Using the city of Lincoln, Nevada, as a model, the study estimated that each sensor node would cost approximately $100,000, with an annual maintenance cost of approximately $10,000 (2003 prices), or an amortised cost of $40 per person per year, that is $10-15 billion nationally.

71. A rational, multi-layered biological and chemical defence architecture, combining and integrating currently available and tested tools is a more realistic and preferable short-term option. This approach relies on the constitution of vertical and horizontal webs or layers of detectors. A rational distribution of detectors at potential target points can constitute a first horizontal layer of protection. However, this supposes that governments define priorities and are willing to decide which infrastructures are critical. The vertical component calls for the use of different layers of detectors, from the less sensitive and precise (usually the detectors that allow for continuous and indiscriminate detection) to the more accurate (usually using more labour-intensive and complex technologies). The consecutive use of detectors will allow a move from mere suspicion to certainty, as well as a reduced chance of false-positives and false-negatives. A further objective is to improve the compatibility and synergy between different detectors. Integration of detectors with other indicators or sources of information - intelligence, syndromic surveillance data, etc. - should also be a priority. When the Committee visited the United States in September 2005, it was briefed on some of the public and private initiatives currently being developed to create integrated emergency management systems. One such example in the area of biodefence is the U.S. National Biosurveillance Integration System (NBIS), which, when fully operational, should integrate data collected from sensors throughout the country (BioWatch), information from health (BioSense) and agricultural

surveillance and terrorist-threat information from law enforcement and intelligence communities.

72. Other prevention or response policies also need to complement this detection architecture. In particular, prevention initiatives include controlling access to hazardous material, such as deadly pathogens or dual-use chemicals. Security standards for labs and other facilities involved in sensitive chemical and biological-related activities should include both national and international initiatives and should engage the private sector. Several initiatives are underway to develop codes of conduct for scientists engaged in such research activities. Exports control mechanisms and threat reduction programmes in the Commonwealth of Independent States (CIS) region, for example, help improve global bio- and chemical security. The Biological Weapons Convention regime, the Organisation for the Prohibition of Chemical Weapons (OPCW), as well as the World Health Organisation (WHO), also contribute to the prevention and response to biological and chemical terrorism.

73. Investment in R&D for new related technology is crucial to ensure that protection mechanisms are constantly adapted to new threats and needs. This can be achieved by various means. Public funding is important, but alone it cannot provide for the whole research effort. Civilian-military partnerships have allowed for the development of new technology and adaptation to the needs of first responders. Governments have also explored ways of fostering public-private partnerships. These are potentially very efficient tools, as long as governments enforce appropriate standards and oversight. In the US, the Homeland Security Advanced Research Projects Agency (HSARPA) is the Department of Homeland Security's arm for engaging industry, academia, government, and other sectors in innovative R&D, rapid prototyping, and technology transfer to meet operational needs. In April 2004, this agency awarded contracts to 14 teams amounting to a total budget of $48 million for the development of a new generation of biosensors, including detect-to-treat and detect-to-protect technologies.

74. Finally, it should be kept in mind that efforts towards the development of new technology also prepare our societies for other kinds of non-deliberate events and broaden policy objectives, such as the advancement of science in the field. A very timely example is the protection against agroterrorism, that is the contamination of field crops, animals, food items or water supplies. Monitoring agriculture is not only protecting against terrorism, it is also protecting against natural disease outbreaks, such as, for example, avian influenza.

IV. RADIOLOGICAL AND NUCLEAR THREATS: MECHANISMS FOR DETECTION

75. The International Atomic Energy Agency (IAEA) has categorised four potential nuclear security risks: theft of an existing nuclear weapon; radiological hazards caused by an attack on, or sabotage of, a nuclear facility or transport vehicle; acquisition of nuclear material and preparation of a primitive or improvised nuclear weapon; malicious use of radioactive sources, particularly in a so-called "dirty bomb". Preparedness scenarios have focused mainly on the last two categories - primitive nuclear weapon or "dirty bomb".

76. Terrorist groups armed with radiological weapons are one of the gravest risks our societies faces. Unlike nuclear weapons, radiological dispersal devices (RDD), or "dirty bombs", are not very hard to acquire, transport or build. A "dirty bomb" does not trigger a nuclear reaction or involve a nuclear explosion. It consists of a high explosive, e.g. semtex, dynamite or TNT, some incendiary material, e.g. thermite, and some radioactive material. The detonation of the conventional explosive would spread radioactive material and contaminate personnel, equipment, facilities, and terrain. The fire caused by the incendiary material would carry the radioactivity up into the air, further spreading contamination.

77. A "dirty bomb" is likely to result in some immediate deaths and serious injuries, caused by the explosion of the conventional explosive rather than by exposure to radiations. Effects on the health of those exposed to radioactivity depends upon how long they remain in the contaminated area, the size of the particles released by the explosion, and the type of radioactivity emitted. While such weapons would bring about far less damage than a nuclear explosion, which would result in hundreds of thousands of casualties, RDDs have enormous power to intimidate and also have the potential to cause serious social, psychological and economic disruption. Decontamination would be very costly and would last for weeks, if not months. According to one estimate by the Center for Homeland Security and Defense (CDHS), a terrorist attack on a major port could result in losses of $1.5-2.7 billion per day for the first few days, $5 billion a day

for the next two weeks, and could then rise exponentially thereafter.

78. A simpler RDD would aim at spreading radiological material without the use of an explosive, for example in water or food supplies, or by simply placing radioactive material in a public location, e.g. a trashcan on a busy street, to contaminate people passing by. Although such a device would probably have limited effects, it would also be difficult to detect before a significant number of contaminations occur.

79. An estimated ten million radioactive sources exist around the world, with several hundred thousand sufficiently radioactive to pose a health threat. Potential radioactive sources for an RDD include Cobalt-60, Cesium-137, Iridium-192, Strontium-90, Americium-241, Californium-252, and Plutonium-238. The most typical areas where radiological materials are used are hospital radiation therapy (Iodine-125, Cobalt-60, Cesium-137), radiopharmaceuticals (Iodine-131, Iodine-123, Technetium-99, Thalium-201, Xenon-133), nuclear power plants spent fuel rods (Uranium-235), universities and laboratories (see information document 186 CDS 05 E). Radiological material is also used in smoke detectors (Americium-241). Other common radiological materials are Iridium-192 and Plutonium-239.

80. Another threat could come from a different type of terrorist attack, using a primitive or improvised nuclear weapon rather than a "dirty bomb". Unlike "dirty bombs", a primitive nuclear weapon - also called improvised nuclear device (IND) - would actually imply the explosion of a nuclear device fabricated with stolen or illegally acquired civil plutonium or HEU. The damage caused through such a device would be great, even if the nuclear explosion induced were relatively limited. The explosion of the high explosives would cause the unfissioned plutonium to be widely dispersed, potentially contaminating large areas. Such an apocalyptic scenario should not be considered completely unrealistic. When the Aum cult prepared its attack on the Tokyo underground in 1995, for example, its initial plan was to fabricate a nuclear weapon and members of the group who were nuclear scientists, had been recruited to acquire fissile material.

81. In the event of a release of radiological material, three types of radiation-induced injury can occur: external irradiation, contamination with radioactive materials, and incorporation of radioactive material into body cells, tissues, or organs. More specifically, there are four types of radiation that are emitted:

82. Alpha Radiation is the heaviest and most highly charged of nuclear particles, however alpha particles are only able to travel a short distance in the air and cannot penetrate the skin. Materials emitting alpha radiation can only harm humans if inhaled, swallowed or absorbed through open wounds. As a consequence, clothing and turnout gear can keep alpha emitters off the skin. Various instruments are available to detect alpha radiation emitting materials, but special training is essential to make accurate measurements. One example is the palm hand-held precision Geiger-mueller meter that detects and measures alpha, beta, gamma and x-ray forms of radiation. Such instruments are designed for emergency responses, domestic preparedness, hazardous material safety, law enforcement, and compliance verification applications, allowing their users to determine whether a particular area is a nuclear or radiological "hot zone".

83. Beta Radiation occurs when high-energy electrons are emitted from the nucleus of an atom during radioactive decay. Beta radiation can travel in air and is moderately penetrating. Skin injury can occur if beta-emitting materials remain on the skin for a prolonged period of time. If deposited internally, beta contaminants may also be harmful. A survey instrument (such as a Geiger counter CD V-700) can detect beta radiation. Clothing and turnout gears provide some protection to the skin.

84. Gamma Radiation is high-energy photons emitted from the nucleus of atoms. They easily penetrate body tissue and many other materials, and are potentially lethal. Thick layers of dense materials, such as lead, can protect from gamma ray exposure. Clothing and turnout gear provide little shielding from penetrating radiation. Gamma rays can be detected with survey instruments, including civil defense instruments. A standard Geiger counter can measure low levels of radiation, while an ionization chamber is able to measure high levels of gamma rays. The most appropriate instruments to measure accumulated exposure to gamma radiation are pocket chamber (pencils) dosimeters, film badges, thermo luminescent, and other types of dosimeters.

85. X-Rays are an invisible and highly penetrating electromagnetic radiation of much shorter wavelength (higher frequency) than visible light. As with gamma rays, only thick layers of dense materials can defend against x-rays.

86. The threat arising from terrorists trying to smuggle illicit radioactive materials or nuclear fission weapons has forced governments to embark on programmes to protect, control and account for material of proliferation concern. Current efforts to prevent and detect the use of RN material by terrorists have three major aims: 1. securing sensitive material where it is found - i.e. nuclear facilities, medical and industry environments using radioactive sources; 2. monitoring international borders for attempts at cross-border trafficking in RN material; 3. domestic deployment of networks of detectors, to cover critical infrastructures in particular. These three aspects are examined below.

A. PHYSICAL SECURITY OF NUCLEAR AND RADIOLOGICAL MATERIAL AND THE PREVENTION OF TRAFFICKING IN NUCLEAR SUBSTANCES

87. The events of September 11, 2001 have intensified concern that terrorist groups will attempt to steal weapons-usable nuclear material in order to build a nuclear weapon. Although stocks of these materials - plutonium and highly-enriched uranium (HEU) - exist in many countries around the world, the largest inventory is held in the Newly Independent States of the former Soviet Union (NIS). Owing to economic and political turmoil, this material is vulnerable to theft. A close examination of open source evidence reveals 14 confirmed cases of theft or attempted theft of weapons-useable material from NIS facilities between 1991 and 2001, mostly highly enriched uranium. Even in the US and Europe, it has been reported that thousands of radioactive sources have been lost or stolen. According to the IAEA, between 1993 and 2004, there were 650 confirmed cases of illicit trafficking of nuclear and radiological substances worldwide, of which a significant number involved material that could be used to produce either a nuclear weapon or a "dirty bomb". Networks of illegal transfer of nuclear technology, such as the one set up by Pakistani nuclear scientist Abdul Qadeer Khan, the exact reach of which is still unclear, are also a serious concern.

88. Dozens and dozens of instances of profit-motivated nuclear hoaxes have been reported in the media in the past two decades. Such hoaxes involved sellers offering weapons-usable or weapons-grade nuclear material and instead deliver some other bogus radioactive, or in some cases, non-radioactive substance. Such scams increased when economic conditions in the former Soviet Union and Eastern Europe declined in the late 1980s and early 1990s. The region's economic decline coupled with weakened security and enforcement mechanisms and a growing interest on the part of both state and non-state actors to illegally obtain nuclear materials all created favourable conditions for nuclear trafficking scams.

89. All these cases demonstrate the acute need to combine detection policies with effective policies to control the spread of nuclear and radiological material, and nuclear technology in order to limit the risk of terrorists accessing them. More generally, the physical security of nuclear material in all sensitive facilities, as well as the security of nuclear facilities themselves - nuclear power plants, storage sites, etc. - need to be reinforced along common lines. Current initiatives in this area include both national efforts, bilateral and international co-operation. The US leads several threat reduction programmes with CIS countries. The IAEA itself adopted a Code of Conduct on the Safety and Security of Radioactive Sources. Further international initiatives include the G8 Action Plan on Securing Radioactive Sources, adopted at the Evian Summit of 2003 and the Proliferation Security Initiative (PSI) agreed in May 2003, which aim to foster international co-operation and halt illicit shipments of WMD or WMD-related material. Several export control groups, such as the Australia Group or the Nuclear Suppliers Group, are also active in the regulation of transfers of sensitive material and technology.

90. Broader and longer-term efforts to thwart the proliferation of nuclear material and technology could also include the re-shaping of current non-proliferation regimes. However, the failure of the 2005 NPT Revi, ew Conference in New York to reach agreement on the further strengthening of IAEA safeguards demonstrates the difficulty to build consensus on such sensitive issues.

B. DETECTION AT PORTS OF DEPARTURE AND PORTS OF ENTRY

91. Terrorists intending to smuggle radiological materials into target countries aim to exploit weaknesses of the control mechanisms at ports, terminals, border crossing and airports. Both the UK and the US have embarked on ambitious programmes to install hundreds of detectors at major points of entry. The UK Cyclamen programme, agreed in

April 2003, provides for the introduction of routine screening of cargo, vehicles and people entering the UK to check for the illicit importation of radioactive materials. An extensive trial and assessment of radioactive screening equipment was conducted at selected ports in 2002. Drawing on the results of these tests, Cyclamen will procure fixed and mobile detections units. The aim is to screen all air, sea and Channel Tunnel traffic, including container and road freight, post and fast parcels, vehicles and passengers.

92. As 90% of all traded goods travel by sea on approximately 72 million sea containers a year, port detection mechanisms are of paramount importance. In this respect, national authorities must try to guarantee security without harming commerce. Here again, governments face a strategic choice between a policy aiming at screening 100% of incoming goods at the risk of slowing down trade flow, and one that only screens "suspicious containers", at the risk of overlooking others.

93. Current technologies to detect radiological and nuclear threats are fairly mature. Typically, a detection architecture would combine fixed and hand-held detectors. Fixed detectors placed at ports of departure or ports of entry can help detect radiological or nuclear materials or weapons before they reach their destination. They also contribute to the fight against trafficking of RN materials and weapons. Hand-held devices can also be used at ports for detection or confirmation of the presence of RN material. Additionally, they can help monitor large areas and be used by responders to monitor contamination and decontamination.

94. A combination of active and passive detection can also improve detection capabilities. Passive detection systems are relatively simple and safe to employ, but they can be evaded by shielding. Active systems allow for enhanced detection, also of shielded material. They use detectors that x-ray or irradiate an object with neutrons or high-energy electrons, to either get a "picture" of the contents of a container or "interrogate" these contents by setting off physical reactions. However, active systems are often more costly, inconvenient, complex and are potentially harmful to humans.

95. Prices of RN detectors range from $150,000-$250,000 for radiation portal monitors to $50,000-$80,000 for a large, laboratory-type spectrometer, and as little as $2,000 for a hand-held detector. Recent efforts have involved the development of non-intrusive technology, i.e. devices that do not necessitate manual inspection of the contents of a container or vehicle. These are ideal for quick detection of a great number of containers or vehicles in strategic transit points, such as seaports.

96. Radiation Portal Monitors (RPMs) are a popular choice for nuclear and radiological detection at ports of entry. It is a passive, non-intrusive and quick technology. RPMs can screen trucks, cargo containers, rail cars, passenger vehicles, and other conveyances and detect the presence of various types of radiation. The monitors, which typically consist of an array of detectors in one or two vertical pillars with associated electronics, capture energy emitted by radioactive sources and set off an alarm whenever such a source is detected. RPMs are deployed at major ports and border crossings worldwide. In the US alone, more than 400 RPMs are deployed at 22 major ports of entry to scan the 7 million cargo containers entering the US every year from abroad. The President's budget for FY2006 includes $125 million to continue the deployment and enhancement of WMD Detection Technology at US ports.

97. However, RPMs have been criticised for their limitations. Firstly, they do not identify the exact origin of the radiation and consequently tend to produce a high number of false-positives, responding to naturally occurring radiation materials (NORMs) or medical and industrial isotopes that do not pose a threat to human health. Moreover, they are not sensitive to fissile material, such as uranium-235, which only emits low levels of radioactivity, about one hundred-millionth of the radioactive material that might be used in a "dirty bomb". They are also less efficient in detecting nuclear or radiological material when shielded in lead or other heavy metal. RPMs must therefore be complemented by other, more accurate technology.

98. Among other non-intrusive technologies are active large-scale imaging systems, which use X-rays or gamma-rays to produce images of the content of a cargo container or vehicle within 2-3 minutes. 166 such systems are currently deployed in the US. The Vehicle and Cargo Inspection System (VACIS) produced by the Science Applications International Corporation (SAIC). based in San Diego, California, is an example of gamma-ray imaging technology (price per unit: about $1 million, plus $500,000 a year operating costs). During

its visit to the US, the Committee saw presentations of the VACIS, as well as other detection devices, at the SAIC virtual Emergency Operations Center in McLean, VA.

99. Various gamma and neutron detectors are available commercially, which can identify and distinguish specific radioisotopes. Radiation Isotope Identifiers, for example, are used in conjunction with RPMs to allow for identification of a radioactive source. These hand-held battery-powered gamma-ray spectrometers are capable of detecting gamma and neutron emissions from radioactive sources and identifying the exact source of alarm within minutes, based on the spectrum of radiation or radiation signature. More than 500 of these systems are deployed in the US to equip Customs and Border Protection officers. One manufacturer commercialises RIIs for about $10,000 each. However, these devices have also been criticised for their high rates of false-positives and false-negatives, as well as for their limited sensitivity to the most dangerous materials.

100. During its visit to the PANYNJ, the Committee received a presentation on a new detector developed by Sandia National Laboratory and tested by the PANYNJ. Known as SMART (Sensor for Measurement and Analysis of Radiation Transients) and mounted on a Jeep, this system uses sodium iodide detectors and special software to distinguish between NORMs and other kinds of radiation. This technology is easy-to-operate, mobile and considered fairly accurate. It can be used to complement other radiation detection devices.

101. Recent research into nuclear and radiological detectors focuses on the identification of the neutron and gamma-ray signatures of radioactive sources. Some of these detectors combine gamma-ray imaging and radiation detection. One of the most advanced detection mechanisms currently under development is a neutron generator sensor. Neutrons, unlike gamma rays, can pass through lead or other metal, allowing the sensor to detect shielded nuclear material. The generator bombards a container with neutrons, producing nuclear fissions in materials when in contact with uranium or plutonium. The container is then scanned by detectors, which analyse gamma rays produced by the fission. Specific energy levels correspond to each substance, permitting identification of the substance concealed in the container. This technology would be used as a secondary test when other non-intrusive technologies have revealed an anomaly. Neutron spectrometers function along similar principles, but they identify materials based on the spectrum produced by the scattering of neutrons when bombarded at the material, rather than a gamma-ray spectra. Ultra-high resolution neutron spectrometers are currently under development.

102. Neutron and gamma-ray detection are also the basis for development of glass optical fibre detectors by the Pacific Northwest National Laboratory. These have been commercialised by NucSafe of Tennessee and used by various U.S. and European governments. A light is emitted at the end of the fibres when they are hit by a neutron or gamma ray emitted by radionuclides such as plutonium. Ionising radiation interacts with the scintillating fibres and produces light. Fibre detectors can be used to monitor large areas for illicit nuclear material. Typically, fibre sensors are embedded in roads at border crossings to detect nuclear material smugglings.

103. Detection technology is thus relatively widely available to protect ports and other national points of entry. However, some governments feel that waiting for nuclear or radiological material to reach a nation's ports is an excessive risk and a late detection. To enhance detection of attempted transfers of nuclear and radiological material, as well as to reduce delays and costs, cargo containers should be inspected once only, preferably at ports of departure, and then sealed by electronic systems to ensure that they are not opened en route to their destination. This is the purpose of several bilateral or multilateral cooperative programmes. A major initiative in this area is the US-led Container Security Initiative (CSI). This initiative, launched by U.S. Customs in January 2002, aims to protect containerised shipping from exploitation by terrorists. For this, a team of US officers is deployed to work with host nation counterparts to target and pre-screen all US-bound containers that pose a potential threat. As of June 2005, CSI covered 37 ports in 20 countries at various levels of implementation. The World Customs Organisation, as well as the European Union, have expressed support for the programme and called for its expansion. Initiatives also exist to engage the private sector through voluntary frameworks, such as the Customs-Trade Partnership Against Terrorism (C-TPAT). In addition and as a complement to the CSI, the US State Department run programmes to install RPMs in more than 20 countries abroad with the support of the

Departments of Energy and of Defense. $500 million were spent on these programmes between FY1994 and FY 2005.
104. Finally, besides monitoring ports and other points of entry for the illegal importation of radiation emitting materials, the entry of illegal asylum seekers or migrants, some of whom could be potential terrorists, must be controlled.

C. PROTECTION OF CRITICAL INFRASTRUCTURES
105. Many of the devices used at ports of entry can also be used to protect critical infrastructures throughout national territory. For example Radiation Portal Monitors can also be placed at international mail and package handling facilities to screen for radiation. Glass optical fibre detectors can be embedded in major roads.
106. Recent progress in miniaturisation of low power electronics have also made the development of compact gamma and neutron detectors possible. These can be broadly distributed to different categories of personnel for routine use. These instruments are similar to message pagers. They are small, hands-free, low-power instruments which can be worn by law enforcement or customs officers for continuous monitoring. At about $1,600-2,000 each, they are also relatively cheap
107. Such radiation pagers have been used in the US since 1998 and equip more than 10,500 customs officers and border patrol agents. However, their performance is generally poorly rated. In any case, radiation pagers cannot function as independent detection devices and need to be coupled to other more sensitive sensors, in the event of a positive alarm. A more recent technology, called RadNet combines a cellular telephone, a personal digital assistant with Internet access, and a global positioning system (GPS) locator with a radiation sensor. The RadNet detector is fairly inexpensive (about $2,000), lightweight, able to operate at low power and is precise enough to eliminate background radiation emitted by food, medical devices or soil.
108. R&D in new technology is crucial to enhance current systems and compensate for flaws. In the US, several initiatives and programmes aim at supporting research into new detection technologies and ensuring that private as well as public manufacturers respect adequate standards. An example of this is the project to test and assess new radiation detection systems for air, sea and land established by the Department of Homeland Security's Environmental Measurement Laboratory and the Port Authority of New York New Jersey.
109. The project, which was presented to the Committee during its visit to the US, has successfully tested commercially available cargo radiation monitors, hand-held instruments and prototypes of the next generation of detection systems. The Department of Homeland Security has requested $227 million in FY 2006 as part of its internal reform to initiate and coordinate a national effort to develop improved radiation detection technologies, fostering both short-term improvements of existing technology and a long-term transformational R&D programme.
110. Globally, current R&D efforts are directed towards ease of use and integration of several systems for increased efficiency. "Sensor fusion" is the keyword of this trend, that is a combination of data collected by different kinds of sensors to produce the most accurate results. For example, integrated systems would combine information from a portable radiation detection system with that of hand-held detectors and video cameras, or information from gamma-ray detectors, with neutron detectors and detectors that take visual images.
111. Further integration should also be achieved through the combination of data from detectors with information from other sources, such as intelligence. The creation, in April 2005, within the US Department of Homeland Security, of the Domestic Nuclear Detection Office as the primary entity to supervise all efforts aimed at the prevention of nuclear and radiological terrorism is clearly intended as a response to this need for integration.

V. CONCLUSIONS
112. This paper intends to list the various types of devices already in existence, or being developed to identify CBRN agents as early as possible. In the event of attempts to import these agents, or in the event of an actual release of CBRN agents, the most urgent step is

to identify them in order that appropriate measures be taken to protect the civilian population. Time is crucial in preparing for CBRN terrorism.

113. In an ideal world, one might wish for a complete range of devices to be available for use in heavily populated areas. This would be incredibly expensive, as costing estimates in this paper demonstrate. But in the event of an actual CBRN attack, it is almost certain that current capabilities would be insufficient, leading to strong criticisms of both national and local government by politicians, media and public opinion. One crucial challenge of civil protection lies in this very difficult, and yet crucial political assessment of how much is "enough". Only a few common standards can guide this assessment which remains fundamentally country-specific. In operational terms, however, co-operation can be crucial. Euro-Atlantic partners share a common interest in the fight against international terrorism and therefore need to develop common actions, based on shared experiences and resources.

114. Some lessons can be drawn from the review of currently available detection technologies in this report and the way in which they are used. Tools need to be developed to allow for monitoring of large areas and/or critical infrastructure. Devices should also be adapted to the needs of their intended users. First responders in particular need quick and easy-to-use devices, which can detect, and, if possible, identify the source of a contamination. Currently available technology is far from meeting these ideal standards, despite the occasional claims of certain unscrupulous manufacturers. It is therefore fundamental for governments to adopt and enforce strict standards for the use of detection technology, while at the same time continuing to invest in R&D in new devices.

115. The main and most general lesson of this report is that, to be effective, a CBRN detection policy has to make the most of existing technologies by adopting a comprehensive multi-layered approach. Horizontal and vertical networks of detectors need to be built and integrated with other available information sources, be these medical surveillance in the case of a biological attack or, more general, intelligence sources. Priority should also be given to the co-ordination of detection policies with other policies. Although this paper focuses on technology, it should be clear that technology does not provide an exclusive answer to terrorist threats. Intelligence is crucial to helping us understand the threat and direct the use of necessarily limited resources. Prevention policies, particularly those addressing the root causes of terrorism should also be developed.

116. More generally, the technological dimension of terrorism preparedness efforts should not overshadow the human dimension. Raising the population's awareness, informing and educating it will help make people an integral part of the detection and response architecture. This is certainly not an easy task. Transparency and security are far too often considered as conflicting objectives. Here again, governments must find a balance based on their national traditions, needs and structures. Another fundamental aspect of the human dimension is the need to train those categories of personnel who will be using the various technologies reviewed in this report, i.e. first responders, health care professionals, law enforcement and customs officers, etc., and teach them about both the uses and limitations of detection technologies.

117. In all these areas, international co-operation helps improve global preparedness. Preventing terrorism is our common responsibility. During its visit to the US, the Committee was particularly surprised to hear that some non-governmental experts in Washington feel that NATO has not yet demonstrated a firm interest in engaging in civil protection policies. Your Rapporteur strongly believes that the Alliance could go beyond its existing programmes and reflect upon the positive role that it could play in support of member countries as they prepare for and respond to CBRN terrorist attacks.

118. It would clearly be foolish for us publicly to seek to identify what measures have already been taken, thus, by implication, drawing attention to the gaps. Therefore, the purpose of this paper was to highlight what could be done in advance to protect civilian populations. This will hopefully encourage politicians to enquire what preparations have already been made in their own countries and thereafter to urge their governments at national and local levels to do as much as is financially feasible to fill the gaps. Our civilian population is entitled to expect no less of us.

▶ References available at source's URL.

The Deadliest Mystery in the Middle East

By Gerald Flurry (Editor-in-Chief @ The Trumpet)
Source: https://www.thetrumpet.com/article/10027.20.149.0/middle-east/the-deadliest-mystery-in-the-middle-east

A worker stands next to a container that will be used to destroy chemical weapons from Syria during a press day at the GEKA facility on March 5, in Munster, Germany.

The Middle East is exploding with unrest and violence. But one situation in particular could cause a major catastrophe for the world, including the United States—and is being almost entirely overlooked by the media. It could be the deadliest mystery in the Middle East.

Western intelligence agencies are worried about Syria's chemical weapons. They estimate that Syria has several hundred tons of chemical weapons at perhaps 20 or more sites throughout the country. They are most concerned about the deadly nerve agent, sarin gas. "Syria is thought to possess the world's third-largest stockpile of chemical weapons after the United States and Russia …. Syria's weapons, predominantly deadly nerve agents that can be delivered by artillery rockets, shells and aircraft munitions, were developed for use in a war against Israel" (*Washington Post,* September 6).

Syria has never been known to be a manufacturer of chemical and biological weapons. Where did it get all of these weapons of mass destruction?

Syrian forces have these WMD, and they could use them. President Bashar Assad's regime has said that it might do exactly that against foreign attackers.

But something even more terrifying could happen to those weapons.

Concerns Over Looting

About half of the country is now in the hands of Syrian rebels. Assad's regime looks like it could fall any day. What might happen then? U.S. Secretary of Defense Leon Panetta has said that he is worried that Syria's military could suddenly walk away from its chemical weapons *without securing them*. If that happens, *terrorists could seize them!*

Hezbollah is entrenched in Lebanon, Syria's neighbor to the west. This terrorist group is allied with Syria. Those weapons could go from Syria to terrorists like Hezbollah, and from there to Western targets!

"U.S. and Israeli officials fear that the chemical sites could be looted, leading to weapons being sold or given to radical Islamists or to Iranian-backed Hezbollah fighters. A single crate of artillery shells or a few barrels of chemical precursors would contain enough lethal poisons for a series of terrorist attacks, weapons experts say" (ibid).

So a deadly chemical attack—or *series* of attacks—could happen outside of Libya, in Israel or even in the United States. After all, who do these terrorists hate most of all? *America* is their ultimate target. The attacks on America's embassies and consulates on the anniversary of 9/11 demonstrate that. In October, Iran actually *tried* a bold terrorist attack against America—to assassinate the Saudi ambassador to the U.S. right there in Washington, DC. Thankfully, that plot was thwarted. But just because that attack failed doesn't mean the next one will.

What Happened to Saddam's WMD?

When the United States led a coalition of nations in war against Saddam Hussein in 2003, the consensus in the intelligence community was that Iraq had massive stockpiles of wmd. Today, however, it is widely considered fact that those stockpiles didn't exist.

What is the proof? As Melanie Phillips wrote this past summer, it is simply "that none was ever found, surely one of the most profoundly illogical and imbecilic formulations ever to have fallen from human lips" (*Daily Mail,* July 25).

Saddam Hussein was a vile dictator with many enemies, both nearby and abroad. This man was feared because of these powerful weapons. Yet most of the world apparently believes that he destroyed his own wmd. We haven't found one shred of evidence to prove that he would handicap himself that way.

On the other hand, there is a *mountain* of evidence that Saddam Hussein had WMD. He *used* mustard gas, VX and sarin against the Kurds in the 1980s. He *used* those terrible weapons to fight a war against Iran. He used them many times to kill Iraqis, his own people. So we know those weapons existed.

In 1991, *60 Minutes* spotlighted Saddam Hussein's nuclear bomb program. In 1992, it quoted the United Nations saying that his gassing of the Kurds was almost without parallel since Adolf Hitler and the Nazis. Saddam Hussein *confessed* that he had plenty of wmds in 1995.

In 1996, *60 Minutes* said that Iraq's biological weapons hoard was "much more extensive than anyone had believed." During the Clinton administration, that news program and many others emphasized the danger of Saddam Hussein's weapons. In 1998, President Clinton announced that an Iraqi informant admitted that Iraq was continuing to develop chemical weapons after the Gulf War ended in 1991.

All the major intelligence agencies agreed that Iraq had these weapons in massive amounts. They estimated that there were potentially dozens of chemical and biological weapons sites across Iraq.

The United States couldn't eliminate those chemical threats by bombing the facilities. We had to send in tens of thousands of troops. And that's exactly what we did in 2003, because we were certain that Saddam Hussein had produced massive stockpiles of wmd and that he constituted a clear danger to the United States and other nations.

The U.S. and its allies went into Iraq for the express purpose of getting rid of Saddam'Swmd.. But we didn't find *any!*

What happened to Saddam Hussein's weapons of mass destruction? Where did they go?

The other question is, where did all of *Syria's* WMD *come from?*

There is powerful evidence that those weapons stockpiles *did* exist—and they *do* exist. They were transferred *from Iraq to Syria!*

Ignored Evidence!

The lead-up to the war took about one year. During that time, Israel's prime minister, Ariel Sharon, said that satellite data suggested that Iraq was transferring its wmd to Syria. A UN weapons inspector made the same claim. There were reports of significant truck movement between Iraq and Syria just prior to the U.S. invasion. A Syrian journalist who defected to Paris reported that Iraq's wmd were arriving in Syria, and even identified three places in Syria where they had been buried.

According to terrorism expert John Loftus, who has held some of the highest security clearances in the world, "The best U.S. and allied intelligence say that in the 10 weeks before the Iraq War, Saddam's Russian adviser told him to get rid of all the nerve gas. … So they shipped it across the border to Syria and Lebanon and buried it."

Additional evidence from Iraqi documents seized during the war indicates that Iraq received assistance from Russia in

transporting weapons and missile components across the border. After the war, an Iraqi Air Force commander and a U.S. federal agent who was on the ground in Iraq when the U.S. invaded also revealed evidence of a weapons transfer to Syria. In June 2010, Ryan Mauro of PJ Media produced a detailed report about the Iraq Survey Group, a multinational group tasked with learning what had happened to Iraq's wmd arsenal. This group received *many* credible reports about pre-invasion weapons transfers to Syria.

All of this evidence was later corroborated by one of Saddam's former generals, Georges Sada. He says he is absolutely certain wmd were transferred to Syria just before the war started in 2003.

Over the past year, while Syria has been in turmoil, still more reports about Iraq's wmd being in Syria have surfaced. Yet the media have ignored these reports. *All this evidence* has been simply ignored or shoved aside as propaganda!

Surely you would agree that *something is not right here.* There is more to this than the media have reported.

They accept the notion that no wmd in Iraq after the war proves that they never existed, or that Saddam himself destroyed them! Why? Because it feeds their story that the war in Iraq was unnecessary, and a mistake!

Syria tried to develop its own nuclear program, but Israel quickly destroyed that in 2007. Yet *somehow,* Syria rapidly acquired perhaps the most fearsome chemical arsenal in the region, without the international community really realizing when or how.

Melanie Phillips concluded, "Might some of Bashar al-Assad's chemical and possibly biological arsenal have Saddam Hussein's name on it?"

Why aren't more people asking this question? Why aren't we more curious about it? Does it have to do with politics? There has been a lot of deception here. We need to get to the truth, because *so much* is at stake—perhaps the *lives* of millions of people!

WMD in Jordan

There is something else that figures prominently into this equation. It happened in Jordan.

In April of 2004, Jordanian authorities foiled an al Qaeda terrorist plot. The cell had 20 tons of chemicals, including poison gas! *Twenty tons* of wmd. Al Qaeda's leader in Jordan admitted that the terrorists planned to kill 20,000 to 80,000 Jordanians. King Abdullah ii said this "major, *major* operation" would have "decapitated the government."

Al Qaeda, 20 tons of wmd, and—almost—80,000 murdered Jordanians. Yet the media paid it almost no attention. Nobody asked, *Where did all those chemicals come from?* Maybe they don't want to know the answer: Evidence indicates that those weapons were manufactured by Saddam Hussein and deployed by Syria to the terrorists! (sidebar: "The Stockpiles Were in Iraq").

Syria is the world's second deadliest state sponsor of terrorism. It has actually used some dangerous weapons in that process. It tried to decapitate peaceful little Jordan. Don't you think it might use some of those chemical weapons at its disposal? Or that it could give them to terrorists? Evidence suggests it already has!

Again, this is the fundamental question that no one is asking: Where did these terrorists get 20 tons of poison gas to use against Jordanians? The Jordanians knew: It came from *Syria.*

Will Those WMD Be Used?

Today, with Syria engulfed in civil war and Bashar Assad's regime in trouble, some people are panicking a bit about what might happen to Syria's chemical weapons in the event of a regime change. They are right to panic!

Hardly anyone, though, has bothered to ask about how Syria managed to *acquire* its massive stockpile of wmd. It has never had the reputation for being a large-scale *manufacturer* of such weapons—certainly not like pre-2003 Iraq. Yet when Assad's government said it possessed a deadly wmd arsenal, no one doubted the claim. There were no intelligence reports theorizing that Syria *suspended* its wmd program years ago—or saying that the stockpiles simply do not exist.

No—everyone *knows* they exist. But no one asks how they got there in the first place, because raising that question would lift the veil covering the media's shameful record of deception and lies.

Politicians and news producers are so worried about their own careers that they won't talk about it!

We have a very good idea where the wmd in Syria—and Jordan—came from. And we have an even better understanding of where this horrific situation in the Middle East is leading.

To understand the truth, you have to understand Bible prophecy. Psalm 83 reveals what is ahead. Based on that prophecy, the *Trumpet* has forecast for years that Syria is going to break away from its alliance with Iran. It appears that is what is happening *right now*.

Prophecies in Psalm 83 and Daniel 11 are unbreakable, and they reveal that this world is about to explode with violence—and those weapons of mass destruction will actually get detonated! Those prophecies show that the spark that ignites the next world war will come from the Middle East.

But this horrible news is going to give way to *good news!*

Look at Daniel's prophecy in Daniel 11:40—then follow it to the end. It concludes by talking about the return of the Messiah! The Messiah *is* coming! Fulfilled prophecy in the Middle East is proof of that. And just as sure as these prophecies have been fulfilled, the prophecies about the Messiah's return *will* be fulfilled.

Matthew 24 tells us that if Christ didn't come to *stop* this madness, there would be "no flesh saved alive." But thank God that He *is* coming to stop the mass destruction and the mass murder and lead the Middle East and the world into a time of peace. We are on a countdown to that glorious event!

Fighting weapons of terror

Source: http://www.nato.int/cps/en/natohq/news_122272.htm?selectedLocale=en

Sept 04 – Recent terrorist attacks across Europe have shown that terrorism remains a real threat to Alliance populations. So does the risk that terrorist groups consider the use of chemical, biological, radiological and nuclear materials as weapons. **This year, NATO's Weapons of Mass Destruction Non-Proliferation Centre (WMDC) is celebrating its 15th anniversary and stepping up its activities to respond to these threats.**

To date, no terrorist group is known to have acquired nuclear weapons and the probability of a nuclear terrorist attack remains low, due to the difficulty in successfully developing and delivering a nuclear weapon. However, toxic biological and chemical materials are relatively inexpensive with components widely available on the market and thus potentially to terrorists.

"The current threats to western societies but also to Muslim countries range from Syria's chemical weapons programme to terrorist groups such as ISIL and Al-Qaida and "lone wolf" actors," said Ambassador Sorin Ducaru, Assistant Secretary General for Emerging Security Challenges at NATO.

An evolving threat

The historic agreement on **Iran**'s nuclear programme in Vienna on 14 July 2015, with the strong involvement of four key NATO Allies, seems to have reduced the risk that Iran will acquire a nuclear weapon. But there are still other serious risks and challenges to the Alliance and to international security.

North Korea has shown with its nuclear and ballistic missiles tests in December 2012 and February 2013, condemned by the United Nations Security Council (UNSC), that it could potentially reach Allied or NATO partners' territory with its WMD and ballistic missiles. It continues with its nuclear and ballistic missile activities in defiance of several UNSC sanction resolutions.

Syria had a large chemical weapons programme with more than 1,300 tons of deadly chemicals, such as sarin and mustard gas. While most of the chemical weapons from Syria have been removed and destroyed by the international community[1] and in particular with the assistance of Allied countries' companies and military, less toxic but still highly dangerous chemical materials are still available and used in the country.

According to a report[2] from the Organization for the Prohibition of Chemical Weapons (OPCW), sarin was used in an attack in the Damascus suburb of Ghouta on 21 August 2013 against civilians, including children, and there is a "*high degree of confidence*" that chlorine[3] - a chemical product often used for bleaching and water treatment – was used in the villages of Talmenes, Al Tamanah, and Kafr Zita from April to August 2014.

"Horrible pictures of wounded children and women from cases reported to the members of the UN Security Council are testimony to the real threat," says Wolfgang Rudischhauser, Director of the NATO WMDC. *"Doubts also still remain whether all chemical weapons and nuclear materials in Syria have been declared. Materials could still be falling into the hands of ISIL, a group that has shown by its atrocities committed, including the live burning of a Jordanian pilot, beheadings of men and recently of women, that it is ready to commit the most horrible crimes against humanity,"* he continues.

ISIL is also reportedly interested in acquiring chemical weapons from old Iraqi sites - two bunkers that still contain a stockpile of old weapons - which were once Saddam Hussein's premier chemical weapons production facility. In Libya, chemical warfare agent stockpiles of sulphur mustard were destroyed in 2014. However, more than 800 tons of mostly chemical weapons precursors remain in a storage depot in Libya whose destruction is planned to be completed by December 2016[4] .

In 2015, terrorist attacks on foreigners in Tunisia and the terrorist attack on a gas-producing factory in France have shown how close our populations can come to these threats. They are by no means confined to the Middle East region. *"Attackers could potentially use easily available CBRN* [chemical, biological, radiological and nuclear] *material, such as chlorine, radioactive sources from x-ray machines in hospitals, or highly transmittable viruses such as Ebola and MERS,"* says Wolfgang Rudischhauser.

"Even if they would not lead to a high number of casualties, such types of attacks, due to their unknown consequences and necessary decontamination could lead to panic or significant economic consequences. Attacks on low-protected industrial facilities working with hazardous chemical or biological materials also present a real risk," he adds.

NATO's response

NATO has not remained idle in the wake of these emerging threats. The decision taken by Allied leaders back in April 1999 in Washington to create a WMDC remains as valid as ever. Launched in May 2000 and located at NATO Headquarters in Brussels, the Centre is celebrating 15 years of existence this year and is adapting its response in line with the evolution of these new threats.

"The Centre was central to very extensive information-sharing that took place with Russia in the context of the NATO Russia Council during the timeframe

2000-2005," says Ted Whiteside, NATO's Acting Assistant Secretary General for Public Diplomacy and the first head of the WMDC. *"The subjects covered all aspects of proliferation, with focus on missile technologies. The Centre also conducted discussions with partners. It was an exciting time, we can look back on all of this work with considerable pride,"* he adds.

Since then, many measures have been taken and results achieved in improving NATO's resilience against WMD and CBRN threats, showcasing that the Alliance is prepared to counter the threat.

NATO tools include the build-up of a **NATO Ballistic Missile Defence** capability with interceptors and sensors on NATO territory and at sea, which achieved its interim operational capability by 2012.

The **Combined Joint CBRN Defence Task Force** is a NATO military body specifically trained and equipped to deal with CBRN events and/or attacks against NATO populations, territory or forces. This high readiness force is part of the NATO Response Force (NRF) and can also be deployed to assist Allies in coping with crisis situations such as natural disasters and industrial incidents.

"The task force promotes new capabilities and new ideas in order to respond to new challenges," says Colonel Henry Neumann, Commander Bundeswehr CBRN Defence Command. *"It provides all required capabilities, starting from CBRN reconnaissance, including sampling and identification of CBRN warfare agents, as well as industrial toxic material and CBRN Decontamination,"* he explains.

A deployable analytical NBC laboratory as part of the Task Force can be transported rapidly and easily into theatre to investigate, collect and analyse samples for identification of nuclear, biological or chemical agents. The Alliance also relies on national nuclear, biological and chemical defence capacities of Allies that can be moved quickly into theatre.

NATO also has a **disease-surveillance system** to facilitate the collection of information on any outbreak of disease, fuse data and other information sources and alert NATO commanders of unusual biological outbreaks.

Information and intelligence sharing on weapons of mass destruction and terrorism are important in order to identify potential threats and sources of financing, as well as to track potential attackers, their support networks, weapons-manufacturing sites, and intended transport routes for chemical or biological agents. The **NATO Intelligence Fusion Centre (NIFC)** in the United Kingdom plays an important role in this area. It is a multinational intelligence organisation in which 26 NATO nations are represented. Under the authority of SACEUR, it provides intelligence to warn of potential crises and to support the planning and execution of NATO operations. The WMDC also regularly analyses and reports on WMD threats and issues based on information provided by Allies.

The Alliance's **Joint CBRN Defence Centre of Excellence (COE)** in the Czech Republic provides training and expertise to military personnel in Allied and partner countries and integrates a "Reach Back facility", operating 24/7 to react and provide scientific and operational advice in the event of an attack on military forces and to help protect civilian populations against the consequences of a terrorist attack.

The **Defence against Terrorism Centre of Excellence (CoE)** in Ankara, Turkey, provides advice, training and education on the terrorist threat including on the role of strategic communications in the fight against terrorism and the issue of home-grown terrorists.

Defence against terrorist threats is a key priority area under **NATO's Science for Peace and Security (SPS) Programme**. It is involved in a wide range of CBRN related projects, workshops and training courses. As an example, in line with the decision to intensify relations with Ukraine and eastern partners, two training courses to enhance regional preparedness to respond to CBRN incidents took place in the Czech Republic and Bulgaria with the participation of experts from Armenia, Azerbaijan, Moldova and Ukraine.

NATO is currently planning a 'CBRN Incident Commanders Course' in Kuwait based on a fictitious scenario of a public event threatened by the explosion of an improvised device containing CBRN material.

Other CoEs, NATO agencies and individual Allies are continuously investing resources in warning and preparedness, individual

protection and CBRN hazard management capabilities to be ready to respond in the event of an attack.

1. https://www.opcw.org/news/article/disposal-of-effluents-from-neutralised-syrian-chemical-weapons-completed/)
2. http://www.opcw.org/index.php?eID=dam_frontend_push&docID=18118
3. http://photos.state.gov/libraries/netherlands/328666/pdfs/THIRDREPORTOFTHEOPCWFACTFINDINGMISSIONINSYRIA.pdf
4. https://www.opcw.org/news/article/opcw-adopts-a-decision-on-reports-of-the-fact-finding-mission/
5. https://www.opcw.org/news/article/libya-completes-destruction-of-its-category-1-chemical-weapons/

'Alien nuclear wars could be seen from Earth': Signals from chemical weapons on other planets would be visible, claim physicists

Source: http://www.dailymail.co.uk/sciencetech/article-3227625/Alien-nuclear-wars-seen-Earth-Signals-chemical-weapons-planets-visible-claim-physicists.html

- Experts wanted to determine if we could see 'self-destructive' civilizations
- They studied ways in which alien civilizations could destroy themselves
- This included nuclear wars, chemical weapons and the 'grey goo' scenario
- Physicists concluded that nuclear explosions on other planets in the galaxy could be detected in the same way as gamma ray bursts

Why there is not a GC nerve agent?

Source:https://books.google.gr/books?id=KmLHBbK8mdMC&pg=PA102&lpg=PA102&dq=why+there+is+gc+chemical+weapon+gonorrhea&source=bl&ots=6ZP7xD8a6M&sig=lo7h3GuAHAQPPbwsk70QWE6cNKU&hl=en&sa=X&ved=0CDoQ6AEwBWoVChMI7Y3mk_zsxwIVpBnbCh1-AwTO#v=onepage&q=why%20there%20is%20gc%20chemical%20weapon%20gonorrhea&f=false

Chemical Terrorism

One difference between chemical terrorism and accidents is that some agents have no use in industry. Should an incident occur, it is reasonable to assume that it is an intentional release. The most important examples of these are classic chemical warfare nerve and blister agents (See Table 4–2). Nerve agents include two primary categories, V-Series and G series. The most popular of the V-series agents is VX. The G agents include tabun (GA), sarin (GB), and soman (GD). The most widely used has been sarin. The "G" designation stands for German. Each of the agents in this series were developed in the 1930s and 40s by Germany. Tabun was discovered first and called German agent A or "GA," sarin (GB) was second, and soman (GD) was third. The GC designation was skipped because it is already a widely used abbreviation for gonorrhea. A lesser known GF agent was also discovered

Serstech 100 Indicator

Source: http://www.serstech.com/product/serstech-100-indicator/

The Indicator provides everything you need to perform on-the-spot chemical screening, identification and verification. It is highly portable because of its small size and energy-efficiency, and affordable, thus providing you and your staff with an accurate chemical-identification tool at all times, when and where

With the *point and shoot adapter* analysis can be made from any surface by gently pressing the adapter against it.

The 90° *angled adapter* offers several convenient ways of measuring.

you most need it. The Indicator is based on our ultrasmall Raman spectrometer (785 nm) and is commercially available. Contact us today to find out more or to discuss your organization's needs.

… in short

- Three modes of operation
  - Screening – check if a sample contains a restricted substance
  - Identification – see what substances are in the sample
  - Verification – confirm that a sample is what you expect it to be
- Rugged waterproof design (Mil-Spec and IP67)
- Truly handheld format
- Intuitive user interface
- Auto-exposure for optimized measurements
- Advanced mixture analysis
- Library Manager
- Non-touch screen for reliable usage in any conditions
- Self-calibration for enduring accuracy

- Multi-language support

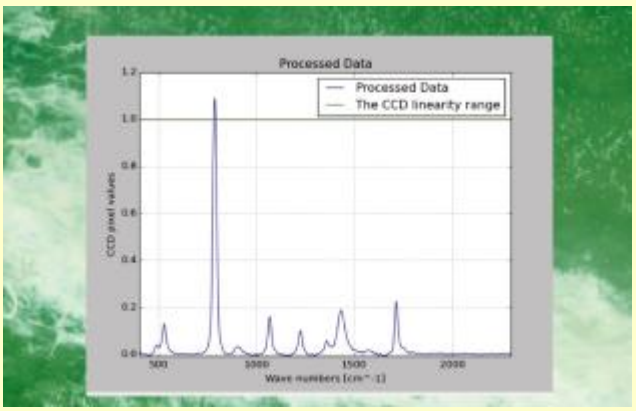
Technical Specifications

Part No	**IND-1001**
Instrument type	Handheld Raman spectrometer
Laser Excitation Wavelength	785nm, Stability
Laser Output Power	Max 300mW
Max Spectral Range	450 cm-1 to 2 300 cm-1
Spectral Resolution	10 cm-1
Detector Type	Linear CCD Array
Display	3,5" transmissive color TFT with LED backlighting
Memory	Enough for 20 000 measurements (4 GB)
Data Formats	Text; .txt, .csv
Connectivity	USB 2.0
Battery Rechargeable	Li-ion, capacity 7,22 Wh, >4 hrs Continuous Operation, non-user replaceable. Use a standard USB Power Pack for extended operational time.
AC Adapter	5 VDC/1 A USB for Charging
Weight	650 g (1.4 lb)
Size	15.8 cm x 10.1 cm x 2.9 cm (6.2 x 4.0 x 1.1")
Operating Temperature	-20 °C to +40 °C
Storage Temperature	-30 °C to +50 °C
Included accessories	Instrument, watertight case, shoulder strap, USB cable, laser aperture cap with polystyrene target for self-calibration, sample vials, point-and-shoot adapter, vial holder, 90° angle adapter, attachment point
Exposure	Manual mode (0.02 – 60 sec) and automatic mode. Time-delay 0-999 sec.
Basic Database	>100 substances with compound data. Wide range of categories represented, e.g. Narcotics and Precursors, Explosives, Pharmaceuticals, Solvents, Polymers.
Databases	Choose from 8 000 substances in more than 20 sub-categories incl. Cosmetics, Food, Polymers, Pharma,Explosives, Forensics and Hazardous Chemicals. Users can also create their own database at no extra cost
Warranty	1 year standard, users can buy two additional years
MTBF	50 000 h
Relative humidity	5-90%
Approvals	EN 60825-1:2007 Class 3B, EN 61000-6-3:2007, AS/NZS CISPR 22, EN 61000-6-1-6-1:2007, EN 61000-4- 2,-3, EN 60950–1:2006–05-29 + A1/A2/A11/AC1, EN 60950-22:2006-06-19 + C1/A11/A11C1, EN 61010-1:2010 (Third Edition), Directive 2012/19/EU (WEEE), Directive 2011/65/EU (RoHS), IEC 60529 IP67, MIL-STD-810G 514.6 (vibration), MIL-STD-810G 516.6 (functional shock)

Part No	IND-1001
Multilanguage	English, German, Japanese, Russian, Danish and Swedish. Please let us know if you need more.
Software	Data Management Tool (DMT) is designed to help the user manage all data on the instrument. It is available for MS Windows and Mac OS X.

Build your own database easily

- Select "Add substance"
- Select no of measurements
- Measuring …
- Done!
- Later, rename substance(s) via our DMT software on your PC
- Ready to share between instruments
- Expect more software tools soon



… or choose from more than 8,000 substances in 20 sub-databases

Aldehydes and Ketones	High Production Volume HPV
Alcohols and Phenols	Hazardous and Toxic Chemicals
Biochemicals	Hydrocarbons
Dyes, Pigments and Stains	Narcotics
Esters, Lactones and Anhydrides	Pesticides
Explosives	Pharmaceuticals, Drugs and Antibiotics
Flavor, Fragrances and Cosmetic Ingredients	Polymers and Additives
Food Additives and Packaging	Semiconductor
Forensics	Solvents
Hazardous Chemicals	Sulfur and Phosphorous Compounds

Inspired by butterfly wings, scientists design a new gas sensor

Source: http://www.exeter.ac.uk/news/research/title_468550_en.html

Sept 11 – **The unique properties found in the stunning iridescent wings of a tropical blue butterfly could hold the key to developing new highly selective gas detection sensors.**

Pioneering new research by a team of international scientists, including researchers from the University of Exeter, has replicated the surface chemistry found in the iridescent scales of the **Morpho butterfly** to create an innovative gas sensor.

The ground-breaking findings could help inspire new designs for sensors that could be used in a range of sectors, including medical diagnostics, industry, and the military.

The University of Exeter reports that the research, published in *Nature Communications* on 1 September, describes how the composition of gases in different environments can be detected by measuring small color changes of the innovative bio-inspired sensor.

Professor Pete Vukusic, one of the authors of the research and part of the Physics Department at the University of Exeter said: "Bio-inspired approaches to the realization of new technologies are tremendously valuable. In this work, by developing a detailed understanding of the subtle way in which the appearance and color of the Morpho butterfly arises, and the way this color depends on its local environment, our team has discovered a remarkable way in which we can advance sensor and detector technology rapidly."

Tiny tree-like nanostructures in the scales of Morpho wings are known to be responsible for the butterfly's brilliant iridescence. Previous studies have shown that vapor molecules adhere differently to the top of these structures than to the bottom due to local chemistry within the scales. This selective response to vapor molecules is the key to this bio-inspired gas sensor.

The research team, led by scientists from GE Global Research in the United States and including scientists from the University of Exeter, State University of New York at Albany, and Air Force Research Laboratory, produced these new kind of colorimetric sensors that favorably compete with conventional gas sensor arrays in simplicity, stability, and cost-savings.

At present, reliable and cost-effective sensors for detection of small but meaningful gas leaks in a multitude of industrial processes remain an unmet environmental, health, and safety goal. **The research team believes this highly selective colorimetric sensor could represent a significant advancement in gas leak detection performance in the future.**

Dr. Radislav Potyrailo, the study's lead author and Principal Scientist at Global Research's headquarters in Niskayuna, New York, said: "Material-design principles applied in nature impact many scientific fields. We found the origin of the unusually high gas selectivity of the wing scales of Morpho butterflies and fabricated a new kind of gas sensor based on these principles."

"These new sensors not only selectively detect separate gases but also quantify gases in mixtures, and when blended with a variable chemical background. Our next goal is to make these sensors in a cost-effective manner to offer new attractive sensing solutions in the marketplace."

Dr. Timothy Starkey, researcher at the University of Exeter, said: "Our research into these bio-inspired sensors demonstrates the huge value in applying the scientific learnings from the biological world to develop technologies for real world applications."

— Read more in Radislav A. Potyrailo et al., "Towards outperforming conventional sensor arrays with fabricated individual photonic vapour sensors inspired by Morpho butterflies," Nature Communications 6, Article number: 7959 (1 September 2015).

UN inquiry to determine who is responsible for chemical attacks in Syria

Source: http://www.homelandsecuritynewswire.com/dr20150911-un-inquiry-to-determine-who-is-responsible-for-chemical-attacks-in-syria

Sept 11 – **Russia has withdrawn its objections to a UN investigation into identifying the culprits responsible for chemical attacks in Syria, allowing a probe to begin,** UN diplomats said Thursday.

On 7 August the UN Security Council unanimously adopted a resolution approving a joint investigation by the United Nations and the Organization for the Prohibition of Chemical Weapons (OPCW). UN Secretary General Ban Ki-moon had proposed that the investigative team should consist of three independent experts, and asked the Security Council for the go ahead to recruit them.

Russia, which heads the council in September, has been slow to respond.

Newsweek reports that according to diplomats, Russia wanted

guarantees on several points, among them that the sovereignty of its Syrian ally would be respected, and on the mission's financing. These conditions already represented a concession by Russia. For the last two years, Russia had insisted that a series of UN investigative teams sent to Syria would be limited to finding out whether or not chemical weapons had been used, but would be barred from identifying who was responsible for launching them.

On Wednesday, Ban sent a a letter to Russian ambassador Vitaly Churkin, assuring him that the United Nations would "expeditiously consult" with Damascus on an agreement governing how the mission will function and that there be "reasonable grounds" for its demands for access.

The Syrian government is expected to cooperate fully with the investigators.

In a statement on Thursday, Ban said he would "without delay, undertake all steps, measures and arrangements necessary for the speedy establishment and full functioning of the [joint investigative mechanism]."

He did not say when the investigation would begin, but called "on all parties in the Syrian Arab Republic to cooperate fully."

The Russians also wanted the investigators to look into the use of chemical weapons in Iraq by Islamic State militants. This, however, would have required a new resolution and the agreement of the Iraqi government.

The Kurdish authorities in Iraq charged that last month ISIS had attacked Kurdish fighters with sarin gas in Iraq and in northern Syria.

Western intelligence agencies have gathered evidence that the forces of Syria's Bashar al-Assad have used barrel bombs filled with chlorine in attacks on civilian villages and neighborhoods in areas held by anti-regime rebels.

Russia argues there is no proof implicating the Assad regime in the use of chemical weapons, although the Syrian army is the only force in Syria with an air force, and hence the only force able to drop chlorine bombs from helicopters.

Newsweek notes that the UN investigators will be tasked with determining who is responsible for the chemical attacks. Whether or not sanctions can then be imposed by the Security Council is a different question, since Russia would likely use its veto power to prevent further measures against Assad.

Here's the Good News on ISIS's Stash of Chemical Weapons

By Scott Savitz

Source: http://www.newsweek.com/heres-good-news-isiss-stash-chemical-weapons-371224

Sept 11 – Recent reports of ISIS chemical attacks on Kurdish forces are, naturally, cause for concern.

The self-proclaimed Islamic State, better known as ISIS, is a nihilistic group that already burns, beheads and rapes. Why would it hesitate to add weapons that have been "condemned by the general opinion of the civilized world" to its long list of horrors?

This news doesn't necessarily suggest a technical breakthrough for ISIS, nor does it indicate that the group could launch chemical attacks beyond Iraq and Syria. And it doesn't change much for the coalition. As U.S. Marine Corps Brigadier General Kevin Killea said last month, "We really don't need another reason to hunt down [ISIS] and kill them wherever we can and whenever we can."

Chemical weapons are often called "weapons of mass destruction." But many of them have limited effects per pound, comparable to those of explosives. Mustard gas, which ISIS reportedly used, is a legacy of World War I, not a sophisticated weapon. It injures the eyes, skin and airways but rarely kills.

This makes mustard effective on the battlefield, however, so the reports are bad news for ISIS's foes on the ground. When mustard injures one soldier, many others must transport him behind the lines for treatment. Mustard injuries are also very painful and disturbing in appearance. This can demoralize troops, even those who were not exposed. And since the mustard agent is heavier than air, it lingers in trenches and bunkers, turning havens into hazards.

Gas masks and chemical suits can provide protection, but they have disadvantages. Masks interfere with breathing, sight, hearing and

communication. Gloves make it hard to use weapons, communications devices and other objects. And the entire outfit subjects soldiers to heat stress, a notable drawback when you're already baking under the sweltering Middle Eastern sun.

Besides the battlefield efficacy of chemical weapons, ISIS is probably drawn to them for their disproportionate psychological power. Like beheading hostages on camera, chemical attacks grab horrifying headlines and linger in the mind's eye.

For example, the 1995 Tokyo subway attack resulted in 13 deaths and 6,000 injuries. But it is remembered around the world today because the perpetrators released sarin gas. Likewise, the chemical attacks of World War I that began 100 years ago are better remembered than some of the conflict's other horrors.

Unfortunately, use of these weapons isn't a new phenomenon for the Middle East, especially for the Iraqi Kurds. They've endured more chemical attacks than any civilian population in the region, including extensive barrages by Saddam Hussein in the 1980s.

In 2013, the Bashar Assad regime launched chemical attacks in Syria, albeit on a smaller scale than those that Hussein carried out against the Kurds or those against Iran in the Iran-Iraq War of the 1980s and the Yemeni civil war of the 1960s. Syria's mustard stockpiles may have been the source of ISIS's arsenal.

However, there's no sign that the mustard agent in play is likely to be used outside the region. To launch a substantial attack, ISIS would literally need tons of mustard. Safely smuggling such quantities to another part of the world would be much harder than conducting attacks with guns or explosives.

Thus, the renewed use of chemical weapons on the battlefields of Iraq and Syria is a dangerous regional phenomenon but not an imminent global threat.

***Scott Savitz** is a senior engineer at the nonprofit, nonpartisan Rand Corporation.*

EDITOR'S COMMENT: I would expect from a Rand's analyst to be more realistic instead of optimistic. IS jihadists that until now have showed no respect at all to human life might easily use CBR agents not only locally but also internationally. If we think that this is just a "regional" phenomenon, then the surprise would be enormous if they are used in Western urban environment. Better stay alert than sorry!

Spy bosses braced for jihadi chemical attack on UK soil - using DRONES

Source: http://www.express.co.uk/news/uk/604860/Spy-bosses-braced-for-jihadi-chemical-attack-on-UK-soil

Sept 14 – Red warning lights are activated in the GCHQ intelligence centre every time equipment which could be used in a deadly attack are bought online.

Customers are investigated if their online shopping basket throws up any red flags, such as glass funnels, measuring cylinders and protective clothing, which can be bought easily on eBay or Amazon for as little as £10.

Security agents have been on high alert after learning that universities in ISIS-controlled territory are giving terrorism lectures to British jihadis, who may return to UK soil to carry out their attacks. Trainee terrorists are attending organic chemistry and toxicology seminars in Mosul University in northern Iraq, which was closed in 2014 after the region was taken over by ISIS but re-opened soon after with new buildings and jihadi-approved courses.

Now it is feared that students may use their knowledge to launch a devastating attack on the UK - possibly using miniature drones, which are easily available for just £500.

A British-designed anti-drone system called AUDS (Anti Unmanned Aerial Vehicle Defence System) has been developed and would be used against drones in such an

attack. The manufacturers boast that the system can disable a 'swarm' of the gadgets within 15 seconds.
Former British Army officer Hamish de Bretton-Gordon, a world-renowned chemical weapons expert, said that ISIS extremists now understand "the ultimate terror weapon."
He said: "Some British jihadis may been trained in the art of making chemical weapons and may have returned to the UK, but the security services are absolutely alive to this. Islamic State now has the ultimate terror weapon in its grasp and will not hesitate to use it again and again in Syria and Iraq, and perhaps elsewhere, until their aims are achieved or they are stopped."
Another security source revealed: "They are very alert to this threat at GCHQ and a red light flashes in a booth every time somebody buys a distillation apparatus on eBay. Equipment sales being monitored also include fume hoods – stainless steel cabinets which remove the highly dangerous fumes produced in the manufacture of chemical weapons – and protective clothing. The threat is very real as IS has made a breakthrough in its chemical weapons capability and is exporting this knowledge to Britain."

Could Nazi 'gold' train be loaded with chemical weapons? Shocking new theory as hunt continues

Source: http://www.mirror.co.uk/news/world-news/could-nazi-gold-train-loaded-6455198

The mystery Nazi gold train whose discovery has led to a mass treasure hunt may be loaded with toxic chemical weapons.
Rather than being filled with gold and gems from the Second World War , a lecturer at a military university in Warsaw claims its cargo could be lethal.
Professor Stanislaw Popiel told Polish paper Gazeta Wroclawska that the nerve gas Tabun could be on board the buried train.

Tabun is one of the most toxic nerve agents and even a short exposure to it can cause death.
During the Second World War Tabun was produced by a German chemical factory in Dyhernfurth - now Brzeg Dolny in Poland - and 12,500 tons were manufactured before the plant was seized by the Soviet Army.

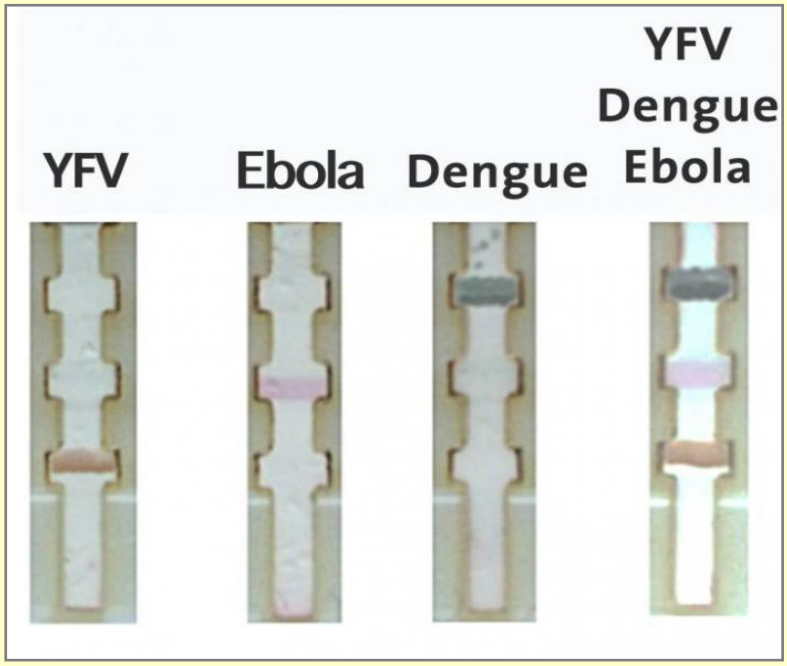
Prof Popiel said it could not be struck out that the train was loaded with Tabun.
He also warned that if the train is discovered and excavated that thorough security precautions had to be taken and the local area would have to be evacuated.
According to local folklore the mysterious train entered a tunnel in 1945 and never emerged.
Rumours of its cargo range from 300 tons of gold to looted artworks or even the plundered walls of a £250 million ornate Amber Room stolen from a Russian palace.
But this is the first time the possibility of chemical weapons being on board has been raised.
In August two amateur treasure hunters, a German and a Pole, claimed they had located the train .
The two men said they would cover the costs of the train's retrieval and want it to become a local tourist attraction.

As the search for the train continues, specialist troops trained in mine clearance have been moved in to the area.
Polish soldiers wearing uniforms identifying them as members of an elite mine-clearing unit were seen walking around the area taking pictures
The tunnels themselves, built by an army of forced labour, snake around the massive Ksiaz Castle.
It has been claimed that as Allied and Soviet forces advanced, the tunnels were constructed to hide Third Reich valuables or V2 bombs.
Local businesses are making the most of the situation - not least the 13th century castle itself, under which some of the tunnels are believed to be.
It is now advertising special tours to the city's underground tunnels, with the tours' logos emblazoned a sparkling steam train.

Rapid paper-strip test for Ebola in sight

Source: http://www.medicalnewstoday.com/articles/298322.php?tw

Aug 24 – Doctors working in remote areas may soon have available a paper-strip test that changes color, depending on whether the patient has Ebola, yellow fever or dengue.



The paper-strip test differentiates Ebola, dengue and yellow fever. Image credit: Chunwan Yen

The new test is featuring at the national meeting of the American Chemical Society (ACS) that is taking place this week in Boston, MA.

The tool works like a home pregnancy test and should help doctors assess potential disease outbreaks, according to the developers.

Standard approaches for testing viral infections accurately and reliably require technical expertise and expensive equipment such as Polymerase chain reaction (PCR) and enzyme-linked immunosorbent assay (ELISA).

But in developing areas far away from big hospitals and laboratories with such equipment, the immediate concern when fever strikes is to quickly establish whether the outbreak is a serious disease that might need quarantine or a less severe illness like the common flu.

This is the problem that the color-changing paper-strip test, developed by Kimberly Hamad- Schifferli, a professor at Massachusetts Institute of Technology (MIT) in Boston, and colleagues, addresses.

Test works like over-the-counter pregnancy test

Prof. Hamad-Schifferli, who heads a mechanical and biological engineering laboratory that develops nanoscale tools, says the test works like the home pregnancy test you can buy over the counter. She notes, however:

"These are not meant to replace PCR and ELISA because we can't match their accuracy. But this is a complementary technique for places with no running water or electricity."

The test comprises three strips of paper and silver nanoparticles that have different colors determined by their size. To detect Ebola, the researchers used red nanoparticles carrying antibodies that bind only to Ebola virus proteins. For dengue, they used green nanoparticles, and for yellow fever, they used orange.

Another antibody "captures" the nanoparticles with the attached virus proteins to fix them in a particular position on the strip, that is different for Ebola, dengue and yellow fever.

Technique 'should work for any disease'

The team tested the tool using small amounts of blood spiked with proteins from the three different viruses. It showed the correct color in the appropriate location on the paper strip, depending on which virus protein was being tested.

For example, if a sample contained the Ebola proteins, the Ebola antibody and red nanoparticle combination picked them up and traveled through the paper until it encountered the second Ebola "capture" antibody located in the middle of the strip. Once captured, the complex stopped in

that location, leaving the red color clearly showing in the middle of the strip.
"The strip looks so simple, but it's incredibly complicated," Prof. Hamad-Schifferli says. "Putting it all together in an integrated system was really challenging."
She says they know their test can detect concentrations of dengue and yellow fever that are well below those found in patients' blood. They are still working on finding out whether this is true of Ebola, but they suspect it is as the test can detect down to tens of nanograms per milliliter.
The team says the platform should work for any disease - you just use the appropriate antibodies. They are planning to make kits for free distribution, as Prof. Hamad-Schifferli explains:
"We're giving people the components so they can build the devices themselves. We are trying to move this into the field and put it in the hands of the people who need it."

The following video **(watch at source's URL)** from the American Chemical Society describes how the paper-strip test works and its potential for use as a provisional diagnostic that helps doctors in the field see how outbreaks are progressing. A paper on the work was also published earlier this year in the journal *Lab on a Chip*.

Medical Countermeasure Planning: An Introduction

By Stephanie Anspaugh-Naples
Source: http://www.cbrneportal.com/medical-countermeasure-planning-an-introduction/

Imagine the following scenario: a large, high profile sporting event is taking place at an open-air stadium with over 100,000 people in attendance. There are local, national, and international media outlets covering the event and tens of thousands of people have flocked into the area to take part in the excitement. Following the national anthem, there is a military fly-over, except this time it looks different. What looks like glitter, rains down from one of the planes, covering the entire stadium and surrounding areas. The crowd pays no attention as the glitter and confetti are assumed to be a part of the planned event. Through information gathered by law enforcement, it is found that aerosolized anthrax was intentionally mixed into the glitter and released over the whole area. All of the people in attendance have potentially been exposed to a highly pathogenic organism. What can be done in order to prevent disease and treat those who are already ill? Luckily, as a result of public health planning efforts in the United States since 2001, most jurisdictions have a plan in place to address these issues.
Planning the response to a biological incident of this scope requires a considerable amount of coordination. The initial response will include steps such as identifying the agent, determining the extent of spread, and coordinating with the media to notify the public. As these tasks are accomplished, priorities must then shift to prophylaxis for those who were potentially exposed and treatment for individuals who were exposed and are now displaying symptoms. In order to comprehend the multitude of issues involved in this type of response, it is essential to begin with an understanding of the basic concepts involved in this process.

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▶ **Read the rest of this article at source's URL.**

Stephanie Anspaugh-Naples *is the State Cities Readiness Initiative Coordinator for the Florida Department of Health's Bureau of Preparedness and Response. Ms. Anspaugh-Naples started her career in public health at the local level with experience in STD, HIV, and hepatitis surveillance, epidemiology, and immunizations as well as public health preparedness. In her current role, Ms. Anspaugh-Naples oversees fourteen grant funded counties including program management, statewide planning, and coordination between local, state, and federal partners. Ms. Anspaugh-Naples earned a Bachelor of Science in Biology from the University of South Florida and a Master of Public Health in Epidemiology from Emory University.*

EDITOR'S COMMENT: Another academic approach based on an old WHO scenario

with anthrax spores – although the article focuses on antibiotic dispersion. The only problem is that this is not a bioterrorism attack – it is a "war" attack and nations possessing BWAs are known. In that respect more "applicable" scenarios should be addressed in order to come out with more viable planning.

No one really knows how likely a bioterrorism attack is

Source: http://arstechnica.com/science/2015/08/no-one-really-knows-how-likely-a-bioterrorism-attack-is/

To analyze the security risks of biological research, policy makers would need to know two things: the likelihood that bioweapons will threaten national security, and the likelihood that legitimate research could be misused to make bioweapons.

Both of these judgments are challenging to make. Since there have been few verified historical examples of bioterrorism or biowarfare, it's hard to know how to quantify these risks. So lawmakers often rely on expert opinions. However, these expert opinions often differ widely, as evidenced by a paper published recently in *Science*.

The authors of this paper invited individuals with responsibility for setting public policy regarding bioweapons to provide their opinions regarding the risks. Included among the participants were past and present US government officials, academics, private sector individuals, and people in industry. They had backgrounds in the biological sciences, medicine, public health, national security, and international affairs. In general, these were people who should know about the topic.

Participants responded anonymously to questions about biological threats, reviewed each other's answers, and were able to amend or maintain their answers based on their review of others' opinions.

These 59 participants were asked to estimate the likelihood of a large-scale biological weapons attack affecting a minimum of 100 people occurring within the next ten years. The responses ranged from a one percent risk to a 100 percent risk, with an average falling at 57.5 percent. Those with a background in biology estimated lower risk of bioweapons use, and baby boomers were more likely to estimate a higher risk than Gen Xers or Millennials.

Participants were also asked about the likelihood of an attack coming from a state or a non-state entity. Again, there was a wide range of opinions, but a covert attack by either a state or non-state group was considered to be more likely than an overt attack by a state. Religious extremists were generally considered to be most likely to participate in an attack.

Of the possible types of biological agents that could be used, biological toxins were considered the most likely to be used, followed by spore-forming bacteria, non-spore-forming bacteria, and viruses. Prions and fungi were not considered to be high risk agents. Among the 59 participants, 53 said there was a 50 percent or lower probability that there would be a warning before an attack, despite efforts among the US intelligence community to actively seek information about forthcoming attacks.

As evidenced by the findings of this study, there are diverse viewpoints among experts regarding the threat of bioterrorism and biowarfare. That makes it particularly challenging to assess the risks involved with pursuing basic biological research that could also be misused. The authors conclude that a clear line defining what is allowable or not allowable may not be possible to

obtain when the people who should know best can't agree.

UAV-Based, Early Warning of Threatening Bioaerosols

Source: http://www.blockeng.com

Block has pioneered the development of systems that can detect and identify chemical threats, as well as protect people and critical infrastructure from terrorist attacks, toxic emissions from production facilities, or accidental releases of poisonous chemicals. Block's products utilize a very well -known and thoroughly validated technology, called Mid-Infrared Spectroscopy, but the company has expanded the use of this technology for chemical detection even further, by coupling it with a new class of lasers called QCLs (Figure 1). Mid-Infrared Spectroscopy is a very powerful technology, which has been developed over many decades and is based on the fundamental principle that essentially all chemicals possess a characteristic, "fingerprint-like" spectrum, when light from the laser is directed at them. The collected spectra are compared to well-developed "chemical libraries" and identification is accomplished in a few seconds, just like a "fingerprint" match with stored databases.

Figure 1: Ultra-Miniaturized QCL Module

Even though this technology is quite powerful, the added QCL-based capability has enabled several previously impossible or prohibitively difficult applications. One of the most important such benefits is the ability of the Block products to analyze the threats **without contact** with the chemical. The standoff distance can be as short as a few inches or as long as several miles, depending on the type of threat. Furthermore, the use of the QCLs in Block products has enabled extremely **rapid** sub-second measurements, since these lasers can tune across the mid-infrared spectrum and collect the spectrum of the chemical in milliseconds. Furthermore, due to their inherent **high brightness**, these QCLs have allowed the possibility of detecting and analyzing very low concentrations of chemicals and, in many cases, detect chemicals in mixtures, or very optically absorbing and opaque materials. Block has also packaged these devices in **miniature**, ruggedized packages, which offer the potential for lightweight, handheld operation under field conditions.

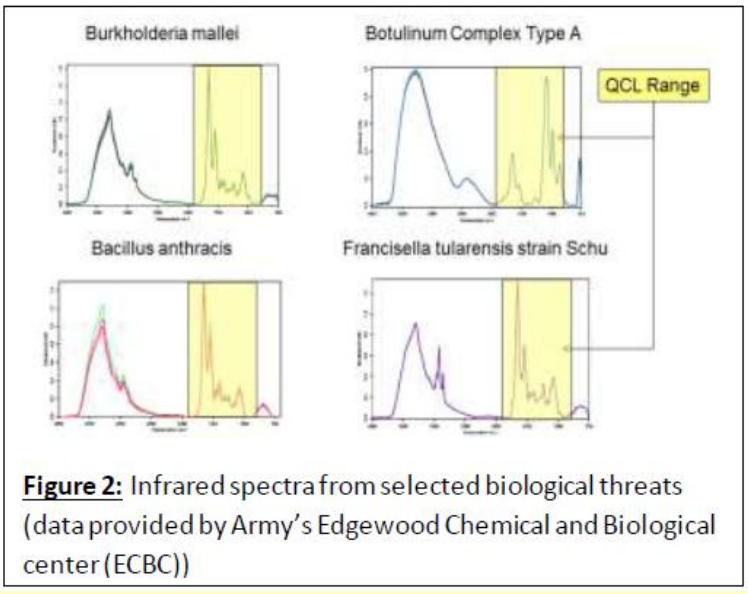


Figure 2: Infrared spectra from selected biological threats (data provided by Army's Edgewood Chemical and Biological center (ECBC))

Following the success of its chemical detection products, Block is now expanding its capabilities into the Biodetection arena targeting applications that can benefit from the advantages listed above. The concept behind Block's entry into the Biodetection area is based on the fact that viruses and bacteria, or their byproducts, such as certain toxins, do have chemical differences, which, as described earlier, is the fundamental principle of Block's capability.

Figure 2 shows the infrared spectra from selected biological threats, showing the strong and distinctly different features, especially in the highlighted range of the Block QCLs.

Using this approach in early experiments with its QCL-based products at a Department of Homeland Security Center of Excellence, Block's LaserScan™ was able to detect and identify several types of

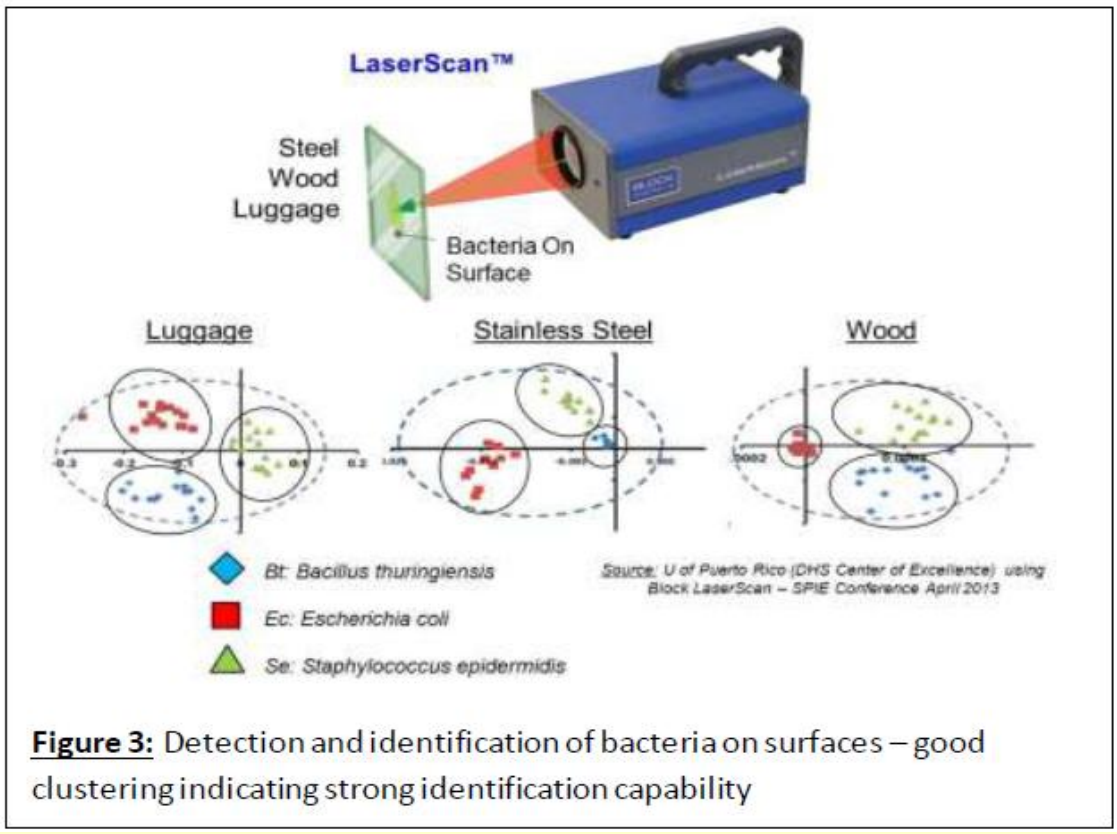


Figure 3: Detection and identification of bacteria on surfaces – good clustering indicating strong identification capability

bacteria on surfaces in a couple of seconds1, with no contact with the bacteria, as shown in Figure 3.

Proposed Concept

Based on the background presented above, Block is proposing to integrate its miniaturized QCLs (Figure 1) into a UAV (e.g., an octocopter), as shown in Figure 4. The UAV will be flying into the suspected bioaerosol and could be alerted of the presence of the aerosol by a built -in simple visible camera, which is only expected to provide visual clues, but not detection or identification. As the UAV submerges into the aerosol, the air will be flowing through a collector. A large particle separator will first eliminate the larger particles (e.g., pollen or dust) and then the air stream will flow through a low-porosity, metallic filter. The filter porosity could be as low as 200 nm, so essentially all small particles above that size

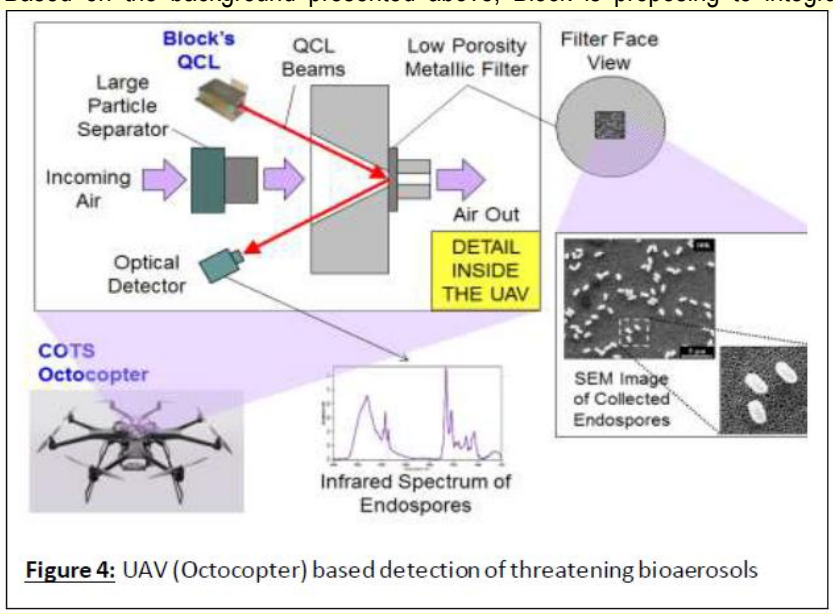
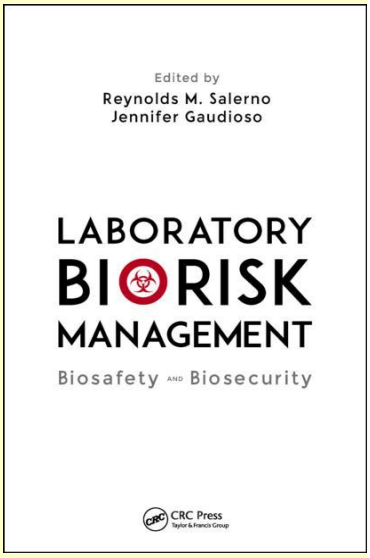


Figure 4: UAV (Octocopter) based detection of threatening bioaerosols

and below the first separator will be caught. The Scanning Electron Microscope (SEM) image in Figure 4 shows the endospores or bioaerosol particles that could be collected on such filter. The laser beam from the QCL Module will be reflecting off the surface of the filter and, as shown in Figure 4, an infrared spectrum of the collected endospores or bioparticles will be generated. The collected spectrum will be compared to a built-in library of biological threats, similar to the one shown in Figure 2, and a match (or not) will be indicated. The result will be wirelessly transmitted
to the UAV operator, potentially miles away, by a simple data stream (e.g., ALERT) well within the transmission bandwidth of the UAV.
If a positive identification has been made, then the UAV could simply be destroyed to avoid further contamination. It is also important to point out that, if the endospores are encapsulated, then the detection would be even easier, since most man-made materials, such as polymers, that could have been used for the encapsulation, have very strong and unique infrared signatures, making them even easier to detect than the endospores themselves. In order to avoid possible clogging of the filters, a mechanism will be implemented that would allow the incoming air to change direction and blow the collected particles off the surface of the filters.

New book details safety, security methods for biosciences sites

Source: http://www.homelandsecuritynewswire.com/dr20150828-new-book-details-safety-security-methods-for-biosciences-sites



Aug 28 – Recent mishaps at laboratories which mishandled potentially dangerous biological substances and the transmission of the Ebola virus in a U.S. hospital are symptoms at bioscience facilities that two Sandia National Laboratories researchers think could be prevented by implementing the practices in a new book on biorisk management.

The 228-page *Laboratory Biorisk Management:Biosafety and Biosecurity*, published by CRC Press, was edited by two Sandia senior managers, Ren Salerno of the Biological Sciences and Technologies Program and Jennifer Gaudioso of the International Biological and Chemical Threat Reduction Program, who have worked for years to improve safety and security at bioscience facilities worldwide.

"This is the first full-length manuscript on the detailed implementation of biorisk management," Salerno said. "Laboratory biorisk management is fundamentally a culture of rigorously assessing risks, deciding how to mitigate those risks deemed to be unacceptable and establishing mechanisms to constantly evaluate the effectiveness of the control measures."
Sandia Lab reports that Salerno, Gaudioso and the other authors advocate a cultural shift in how laboratories, hospitals, and other bioscience facilities approach safety and security. They say that biorisk management should:

- prioritize an intellectually sound, evidence-based decision-making process using substantive risk assessments to evaluate a facility's risk based on the unique
  operating environment
- require implementation of mitigation measures according to the risks of specific activities, experiments or projects
- constantly assess performance
- emphasize more meaningful roles and responsibilities for all personnel within a facility
- assign ultimate responsibility for safety or security performance to top management
- be scalable from the smallest hospital or clinical lab to the largest research institution

About a dozen other Sandia experts in the field paired up with their international counterparts to develop and advance a practical set of concepts relevant and able to be implemented by labs worldwide, Gaudioso said.

In addition to explaining biorisk management and providing a model, the book includes chapters on risk assessments, facility design and controls, training, operations and maintenance, how to evaluate biorisk management performance, communications issues, case studies, and future directions and challenges for biorisk management.

Growth of biosciences necessitates need for change

The time to rethink the safety and security of biosciences facilities is now because of the expansion in scope, scale, and sophistication of the biosciences field over the last fifteen years, Salerno said. Examples of this expansion include the rapid advance of synthetic biology and, following the 2001 anthrax attacks on the White House and Congress, the deep integration of biosciences within national security research.

"The times are changing and what we have never done in the biosafety community is take a good hard look at why we do what we do and ask ourselves if the system needs to be radically reshaped in light of all the changes in biology," he said. "From our perspective, this is way overdue."

Today's biosafety guidelines were created in the early 1980s. The Centers for Disease Control and Prevention partners with the National Institutes of Health to publish biosafety guidelines to protect workers and prevent exposures in biological laboratories, Salerno said.

The current guidelines tier biological agents into four risk groups and designate work with those agents into one of four biosafety levels. Salerno says use of the guidelines has become perfunctory and their nuances are not widely understood by many personnel at bioscience facilities. For example, he said, it has become common practice in the field is to share risk assessments or material safety data sheets between facilities, so that they no longer take into account the unique circumstances of each facility, including location, the type of work done there and the expertise and training of its personnel.

"I believe the events of the last year in this field demonstrate exactly what we've argued: that the current system is broken. It's a systemic problem," Salerno said. "We've created an administrative-based safety culture in biology that is way too simplistic for the level of complexity of today's science."

Global assistance in laboratory security brings issues to light

Sandia scientists became more aware of the issues through their work over the past fiftee years with laboratories around the globe.

In 2008, the European Committee for Standardization hosted an international workshop that published an agreement among 24 countries, introducing an overview of biorisk management. The World Health Organization (WHO), which quickly adopted the biorisk management framework, asked Sandia and other technical advisers to create a two-week Biorisk Management Advanced Trainer Programme, which Sandia experts helped teach in 2010-2011.

"We were barely scratching the surface and everybody wanted more information, more detail and wanted to understand how to implement the concept," Salerno said. "That's when we began talking about the need for a manuscript."

In addition to the book, Sandia also curates the Global Biorisk Management Curriculum, which contains forty-seven separate courses developed by Sandia and others and is being taught by 500 trainers worldwide, Gaudioso said.

Focus on performance can prevent problems before they happen

Salerno said the book promotes the idea that a good biorisk management system determines ahead of time the metrics that will show a project, experiment or activity is being done safely and securely.

The risk assessment completed before an activity has begun sets leading safety and security performance indicators. Then, regular monitoring and documentation will show whether the activity is achieving the safety and security goals, enabling scientists to identify things that are working fairly well, but perhaps not perfectly, while the activity is in progress, he said.

"In other words, by evaluating performance you can adjust your safety measures before something happens," Salerno

said. “You don’t want a bad thing to happen to determine whether or not your system is working.”
Some might view this as added paperwork, but Salerno and Gaudioso point out that experience in other high-consequence industries shows that when processes are more effective and efficient, a more effective safety system is the result, which in turn leads to decreased costs and improved productivity.
Gaudioso explains that a lot of the risk assessment and mitigation work in the book should help institutions solidify good practices and fill in gaps in their procedures.
“The burden should be proportionate to the risk, so that you’re not asking too much from people who are carrying out activities that don’t present a lot of risk to themselves or the community,” she said. “But for people whose activities carry more significant risk, then yes, they have to do a little bit more to make sure they are managing those risks appropriately. I don’t think that’s an unreasonable thing to ask.”

Culture change in biosciences required for biorisk management

Salerno recognizes that the system outlined in the book will not work unless stakeholders in the biosciences community buy into the concepts.
“If someone takes this book, agrees that the performance chapter makes some good points, but then adds a large number of additional and perhaps arbitrary requirements, the system will look like yet another administrative checklist. That would be counterproductive,” he said.
In the final chapter, Sandia researcher Ben Brodsky and a co-author write that biorisk management is a relatively young approach that faces challenges to being implemented broadly.
More evidence is needed to show whether biorisk management works, so they call on more organizations to develop ways to measure the performance of biorisk management and to show how it benefits an organization.
“This will enable the biorisk management community to continue creating tangible benefits for the bioscience community, including keeping society and the environment safe while more efficiently facilitating the delivery of science,” they wrote.

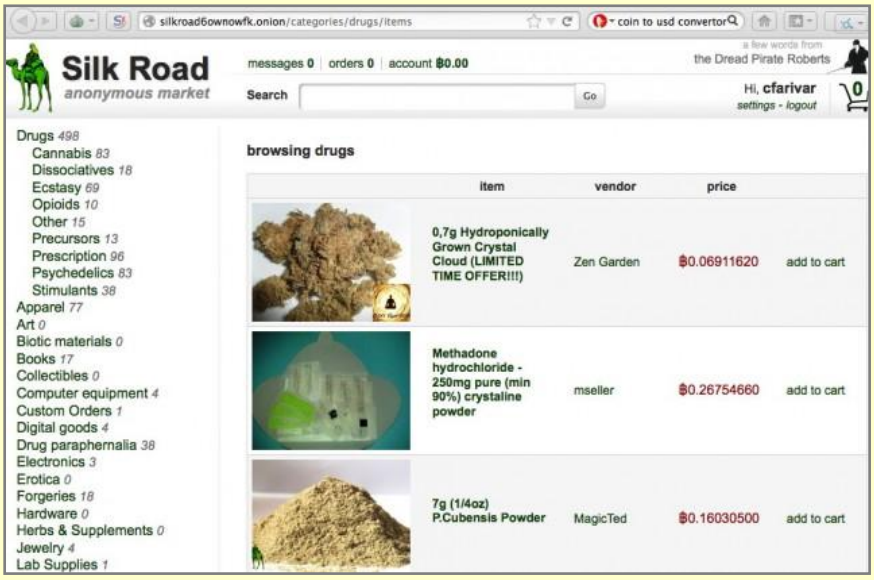
New York Man Convicted of Trying to Buy Ricin 'Death Pills' Online

Source: http://www.newsweek.com/ricin-poison-new-york-man-convicted-death-pills-cheng-lee-366455

Cheng Le is shown in this government evidence photo, which was released by the U.S. Attorney's Office in Manhattan during Le's trial in New York. REUTERS

Aug 27 – A New York man was found guilty on Thursday of trying to buy the deadly toxin ricin on a secretive black market website, with plans to sell it in the form of "simple and easy death pills."
A Manhattan federal jury convicted Cheng Le, 22, of three counts, including attempting to possess a biological toxin for use as a weapon. Prosecutors said Le tried to buy ricin from an undercover FBI employee posing as a vendor on a website called Evolution.

Le faces up to life in prison. His lawyer, Patrick Brackley, said Le planned to appeal. He had argued no proof existed Le was the website



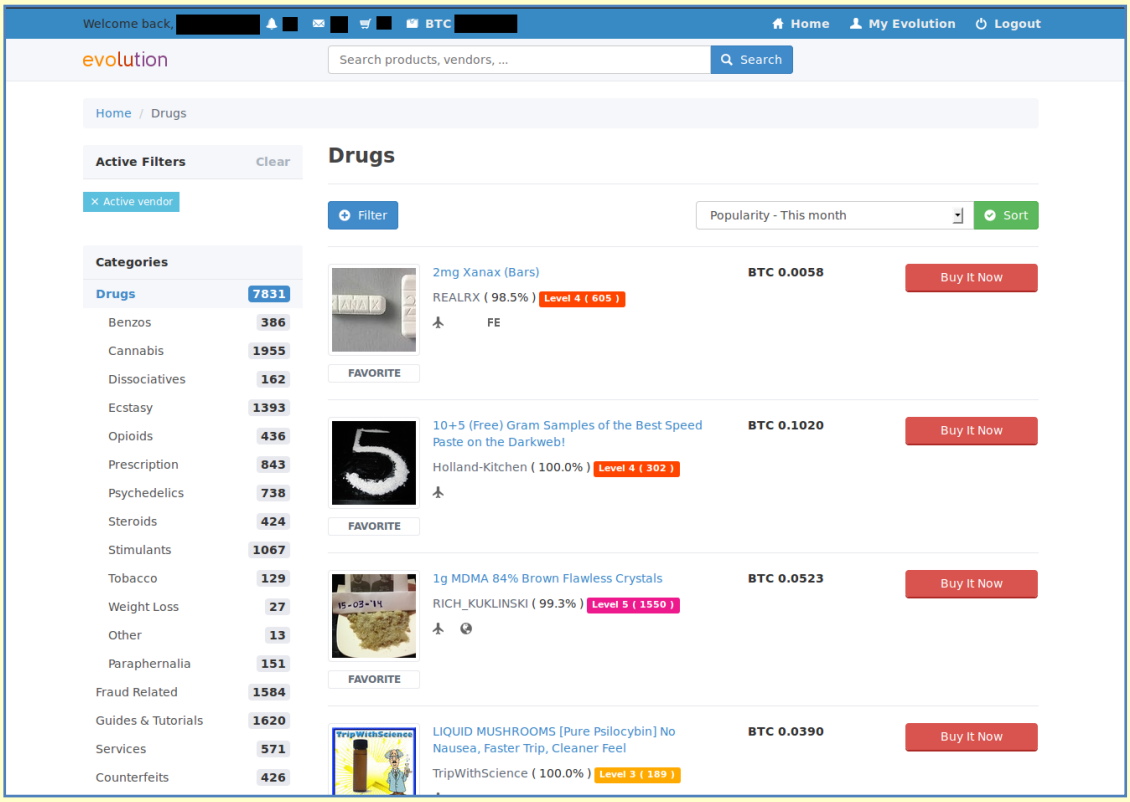
concerned about how these marketplaces could facilitate sales of not just drugs, a focus in past cases, but of items posing threats to national security.

The marketplaces included **Evolution**, which became the largest after the Federal Bureau of Investigation's 2013 seizure of Silk Road, where drugs and other items could be bought with the digital currency **bitcoin.**

Evolution, unlike **Silk Road**, carried not just drugs but also toxins and weapons. It abruptly closed in March, but similar websites remain.

Prosecutors said that in December 2014, Le, going by "WhenInDoubt," contacted an Evolution vendor called "Dark_Mart" about buying ricin.

In messages to the vendor, who was actually an FBI employee, Le



user who sought the ricin.

Law enforcement has been cracking down on illegal activity involving online black markets operating on a hidden network of websites that can only be accessed using specialized browsers.

The four-day trial spotlighted how law enforcement has become increasingly

discussed plans to sell the ricin as "simple and easy death pills" to customers for their own use.

Prosecutors said Le discussed wanting the ricin pills included in a bottle with ordinary vitamins, saying "as the target takes the medicine every day, sooner or

later he'd ingest that poisonous pill and die."
Le wrote, "After all, it is death itself we're selling here, and the more risk-free, the more efficient we can make it, the better," according to prosecutors,
The FBI that month shipped fake ricin to Le, who, wearing latex gloves, retrieved the shipment and took its contents to his apartment, prosecutors said.
Le was arrested at his apartment, where authorities found the fake ricin, castor oil bean seeds (the source of ricin) and Le's computer, which was logged onto the website.

Labs cited for 'serious' security failures in research with bioterror germs

Source: http://www.usatoday.com/story/news/2015/08/28/lab-security-violation-bioterrorism-select-agent-regulation/32439491/

Aug 28 – Amid concerns about the potential of a laboratory insider unleashing a deadly bioterror pathogen on the public, President

Obama ordered greater scrutiny of workers with access to the riskiest microbes five years ago. The goal of the resulting regulations was to prevent something like the 2001 anthrax letter attacks — or worse — from happening again.
Federal regulators have secretly threatened to revoke permits to study bioterror pathogens from at least six labs — including those operated by Brigham Young University in Utah, the University of Hawaii-Manoa and the California Department of Public Health — because they failed to take required actions to assess the behavior and trustworthiness of their workers, plus other kinds of safety violations, records obtained by USA TODAY show.
In a letter to Brigham Young University, regulators said last year that they had "significant concerns" whether its lab staff could work with potential bioterror pathogens "in a manner which does not endanger public health and safety." California's Health Department lab in Richmond allowed unapproved staff to have key cards that let them into restricted areas and "failed to address safety issues over the course of the last four years," regulators told the lab.
The University of Hawaii-Manoa was called out by regulators, in another letter the government and the university tried to keep secret, for “widespread regulatory non-compliance” and "a serious disregard" for regulations for security, biosafety, incident response and training. Issues included failures to implement suitability assessments of key lab staff, installing a security system but not making it operational, and having lab staff that didn’t understand how to use respiratory protection needed to prevent exposure to infectious agents.
Officials at the three sanctioned labs that USA TODAY was able to identify refused to be interviewed but said in emails that the cited violations have been corrected. Brigham Young officials said their lab's security and other violations involved administrative and paperwork issues, such as simply failing to have language in their records documenting their procedures. USA TODAY is working to identify the other three labs, whose names were removed from letters federal lab regulators released under the Freedom of Information Act.

How significant the security violations are is unclear because so much of the oversight of labs working with "select agents" — the government's term for potential bioterror pathogens such as those that cause anthrax, plague and botulism — is cloaked in secrecy. Lab regulators at the Centers for Disease Control and Prevention refused to answer questions.

A spreadsheet of enforcement actions was heavily redacted by the Federal Select Agent Program before being released to USA TODAY. The program is jointly run by the CDC and the USDA. (Photo: USA TODAY)

The Federal Select Agent Program, jointly run by the CDC and the U.S. Department of Agriculture, refused to release the names of more than 100 labs that have faced enforcement actions for a wide range of safety violations since 2003 — even those kicked out of the select agent program. The program cites a 2002 bioterrorism law as justification for redacting lab names from records released to USA TODAY. The news organization has identified several of the labs through its reporting.

The lack of public information makes it difficult to gauge the risks posed by the violations and whether federal inspectors are focusing on issues that have a real impact on improving safety and security, said biosecurity experts and policymakers.

"It's so hard to say how this should be interpreted," said Gigi Kwik Gronvall of the UPMC Center for Health Security, a think-tank, when asked about the suitability assessment violations at the Utah, Hawaii and California labs. Gronvall said she's long heard complaints from labs that inspectors focus on paperwork and minutia, but it's difficult to know whether that's the case.

The bipartisan leaders of the House Energy and Commerce Committee, which has held two hearings on lab safety and oversight in the past year, said they are continuing their investigation to find root causes and solutions to serious safety incidents at U.S. research facilities. Among the high-profile blunders was the discovery this spring that a U.S. Army biodefense lab had been mistakenly shipping hundreds of live anthrax specimens — that it told recipients had been killed — for more than a decade, despite inspections by federal regulators. The problems continued undetected despite regulators previously citing the lab in 2007 for failing to properly kill anthrax.

"After repeated, inexcusable blunders with anthrax, smallpox and other dangerous pathogens, it is clear that this system is not working," said committee chairman Rep. Fred Upton, R-Mich., and Rep. Frank Pallone Jr. of New Jersey, the committee's ranking Democrat, in a statement to USA TODAY.

A CDC inspection report released to USA TODAY by the California Department of Public Health — the only one of the three sanctioned labs willing to release any inspection records — provides a rare glimpse into what lab regulators examine and cite during their visits. Though some

violations involved potential safety issues, many of the violations cited at the Richmond, Calif., lab appear to involve missing language in policy manuals found during paperwork reviews.

Less emphasis should be placed on the paperwork and more on actions that assess and improve safety cultures, some lab experts said.

"Sure, we need regulations and oversight," said David Franz, a former commander of the U.S. Army Medical Research Institute of Infectious Diseases in Maryland. "But safety and security are not enhanced by nit-picking bureaucratic policy manual reviews, arbitrary interpretation of regs and agonizingly slow communication with the labs."

Lab regulators at the CDC are in the midst of a 90-day review of how the agency regulates safety and security at hundreds of public, private and government labs working with select agent pathogens. The review was launched in July in the wake of the USA TODAY Media Network's ongoing investigation that has revealed government inspectors allowing labs to keep experimenting despite failing to meet key requirements on inspection after inspection.

Lab regulators at the USDA are doing a similar review of their part of oversight program. It was launched in June, a spokeswoman said Thursday.

CDC officials declined to be interviewed or to answer questions about their enforcement of the enhanced security regulations, many of which took effect in April 2013 and require initial and ongoing "suitability" assessments of lab workers with access to Tier 1 select agents. This group of pathogens is deemed by the government to pose the greatest risk of deliberate misuse with the most significant potential for mass casualties or devastating economic effects. It includes the bacteria that cause anthrax, botulism and plague, the Ebola virus and several other agents.

The regulations require a variety of security enhancements, including evaluating unusual behaviors, incidents or life changes among lab workers in ways that go beyond FBI background checks. They stem from an executive order signed by President Obama in 2010.

The Federal Select Agent Program cites the anthrax letter attacks in October 2001 — which the FBI says were the result of a U.S. Army microbiologist — as an example of how deadly and financially costly the misuse of a pathogen by a lab "insider" can be. Five people were killed and 17 others sickened. **The contamination caused by the anthrax letters disrupted businesses and closed parts of government, costing more than $23 million to decontaminate one Senate office building, according to a guidance document on the suitability regulations. The Postal Service lost about $2 billion in revenue, and there was up to $3 billion in additional costs to the Postal Service for decontamination and getting mail-sanitizing equipment.**

Among the ways a lab worker could pose a threat, federal officials say:

- **A person with ill intent infiltrates a research facility under the guise of a researcher to steal, release or divert dangerous pathogens.**
- **A person working at the facility is coerced or manipulated into providing access or expertise to people intending harm.**
- **A person legitimately working with pathogens who experiences a "significant life changing event" that prompts misuse, release or diversion of pathogens.**

Letters sent to each of these three labs show that the CDC threatened to suspend or revoke their authorizations to work with select agents if they didn't agree to enter into a federal performance improvement program. Violations at each lab included failures related to the enhanced Tier 1 security requirements as well as other problems.

Brigham Young University in Provo, Utah: An Oct. 30 letter from the CDC to BYU officials noted "serious regulatory deficiencies" in the areas of security, biosafety and incident response. It said BYU failed to establish procedures for pre-access and ongoing assessments of suitability for staff with access to Tier 1 pathogens. Though regulators

said "physical security" of select agent pathogens appears to be in place, "the near complete failure to establish written procedures and provisions to address the requirements for possession of Tier 1 select agents resulted in inspectors being unable to measure the implementation of the required security and safety measures."

Inspectors found that BYU had given staff access to Tier 1 pathogens without conducting pre-access suitability assessments, failed to assess suitability on an ongoing basis and failed to establish procedures for colleagues to report incidents or concerns about a peer's suitability, the letter says. The CDC, it says, has "significant concerns" about whether the university can work with select agent pathogens "in a manner which does not endanger public health and safety."

In emailed answers to USA TODAY's questions, BYU officials said the university's one lab that works with select agents agreed to be put on a performance improvement plan, and it halted select agent research until it completed the plan in in April. The university said the violations noted by the CDC involved paperwork issues: "To clarify, BYU had taken action to verify the suitability of those accessing select agents. However, some of our administrative processes to document our compliance with the assessment standards were in need of improvement."

The CDC letter said BYU "has failed to establish an occupational health program specific to the Tier 1 select agents used and possessed by the university and enroll individual with access … in said program as required." The university told USA TODAY, "BYU did not fail to establish an occupational health and safety program." BYU has such a program, it said, but "had simply not referenced this program in the written biosafety plan."

BYU, a private institution sponsored by the Church of Jesus Christ of Latter-day Saints, said it would not release a copy of the inspection report that prompted the CDC to send the October 2014 letter threatening its lab's suspension or revocation from the select agent program if the university didn't go into the performance improvement program.

Citing "safety and security reasons," BYU would not answer USA TODAY's questions about which Tier 1 pathogens were involved in the research that was suspended in the wake of the CDC's letter. According to information posted on BYU's website, the chairman of the university's microbiology department lists two Tier 1 agents among his research interest: Burkholderia pseudomallei, a bacterium that causes a potentially fatal disease called melioidosis, and Burkholderia mallei, which causes a disease called glanders.

"BYU is confident that ongoing work in the [biosafety level 3] laboratory can be conducted in a safe and compliant way, and the CDC certification of our facility and operation confirms this," the university said in a statement.

University of Hawaii-Manoa: A May 2014 letter from the CDC to the university said findings on inspections had "indicated a serious disregard for these regulatory requirements resulting in observed compliance departures in the security, biosafety, incident response, and training requirements of the select agent regulations." Regulators said the university had "serious regulatory deficiencies" that included failure to implement procedures for pre-access and ongoing suitability assessments of lab workers with access to Tier 1 pathogens. Though the university had installed the hardware for a required intrusion-detection system in Tier 1 pathogen areas, the university "has failed to render this system operational," the CDC wrote.

Regulators expressed concerns about "serious biosafety departures," including "misunderstandings" among staff on the proper use of respiratory protection against exposure to pathogens. Such issues, the letter said, "can result in increased risk of exposure to infectious agents by entity personnel that are not properly equipped or do not understand the use of the respiratory protection provided." The letter said the CDC "strongly recommends" the university cease all work with Tier 1 select agents and enter into a storage-only status until it completed a federal performance improvement program.

University officials declined to be interviewed and did not answer most of USA TODAY's questions. In an email, spokesman Daniel Meisenzahl said the university "fulfilled all requirements of the performance improvement plan," and the CDC renewed the university's registration in June to allow work with select agent pathogens through June

2017. "This is an example of government functioning properly with [CDC's] continuing vigilance toward constant improvement," he said.
The university has refused since last year to release records to USA TODAY about its select agent violations and enrollment in the PIP. In response to USA TODAY's open records appeal to Hawaii's Office of Information Practices, the university told the information office in January that it is "proud" of being put on the PIP and that it "has been an exemplary participant in the Federal Select Agent Program."
Hawaii State Sen. Sam Slom, a University of Hawaii alum and legislative watchdog over the school, said Wednesday that although some secrecy may be warranted, "I think we overuse that as an excuse." He said he'll ask tough questions when the Legislature begins its 2016 session in January and discusses the university's state funding.
"They look at being under the PIP as a point of honor, as if they've done something right — which is wrong," said Slom, the Legislature's minority leader and lone Republican. "My point of view is if you have serious regulatory issues here, particularly that involve public safety, you tell the university: Here's your funding request. We'll hold it until you adequately answer questions."

California Department of Public Health: A February 2014 letter from the CDC expressed "significant concerns" about the Richmond, Calif., facility's oversight of select agent pathogens as observed during an inspection in December 2013 — as well as about repeated failures to correct issues identified during inspections going back to 2009. Regulators noted that the lab failed to meet requirements for suitability assessments for staff with access to Tier 1 agents because procedures were "pending approval from the Human Resources Department" in a process that inspectors wrote they were told "could take years."
Regulators noted that lab personnel who were not approved to have access to select agent pathogens had "unrestricted card key access," and some had "master keys that override the card key access system, allowing them unrestricted access" into areas where select agent pathogens are used. "This same observation had been cited in the 2011 and 2012 inspection reports, but remains uncorrected," the letter said.
The Health Department lab does diagnostic testing as well as research that includes working with strains of bacteria that produce the toxin that causes botulism. Such strains are classified as Tier 1 select agents
Other issues cited by the CDC letter included the lab failing "to meet inventory record keeping requirements over the course of the last four years," and failing "to address safety issues over the last four years," including a lack of evidence since 2009 that all biosafety cabinets — used to protect researchers from exposure to select agent pathogens — were certified annually.
The Health Department said in emails that it entered into a federal performance improvement plan in March 2014 and that the lab was waiting to hear from the CDC on release from the plan after completing the last requirement Aug. 5.
Despite the CDC's citation, the department said it had been conducting the required staff suitability assessments since the regulation took effect in 2013. The department said the issue involved not having all the assessment guidelines incorporated into the lab's security procedure manuals. The manuals have all since been updated, the department said.

Assessing the bioweapons threat

By Crystal Boddie[1], Matthew Watson[1], Gary Ackerman[2], Gigi Kwik Gronvall[1]
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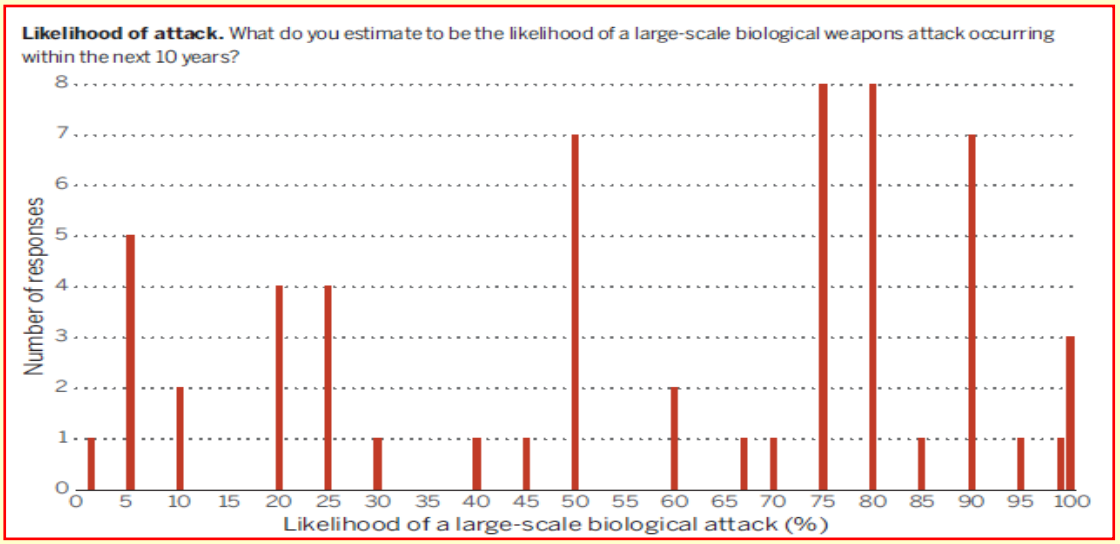
Source: http://www.upmchealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2015/Science2015Boddie7923_1.pdf

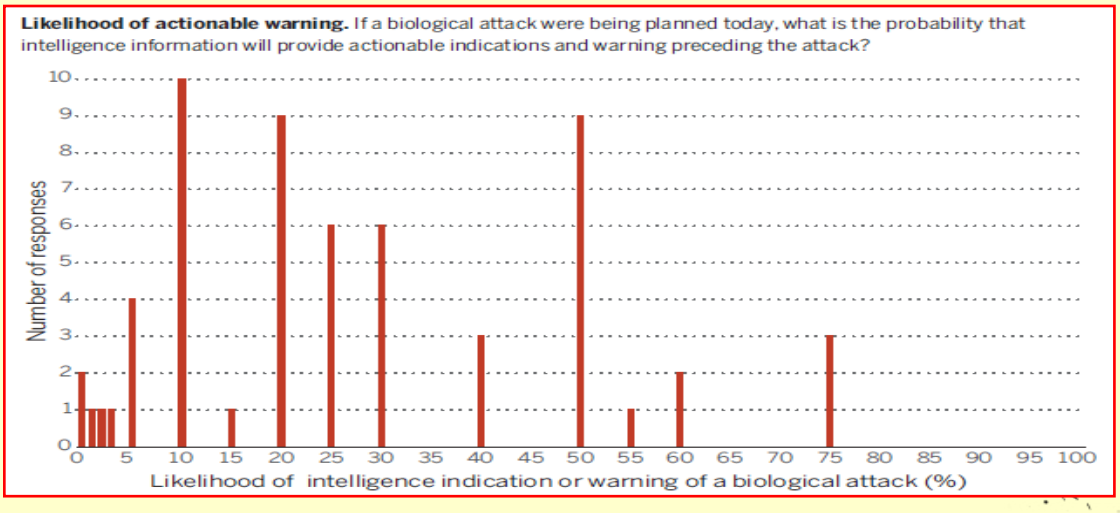
Aug 24 – The U.S. government (USG) has taken steps intended to diminish the likelihood of misuse of research—in one recent action, declaring a funding moratorium on gain-of-

function studies on influenza until a risk-benefit analysis can be conducted (*1*). The analysis is expected to examine biosafety concerns, the potential for such research to produce a biological weapons agent, and the possibility that publication may lower barriers to bioweapons development (*1*). To analyze the security risks of biological research, however, it is first necessary to determine the likelihood that bioweapons will threaten national security and to what degree legitimate research is at risk of misuse. This type of assessment is fraught with uncertainty.

LIKELIHOOD OF A BIOWEAPONS ATTACK.

We asked participants to estimate the percentage likelihood of a large-scale biological weapons attack occurring within the next 10 years in any country (see the first chart). We defined a large-scale attack conservatively, as resulting in more than 100 ill people. There was a wide diversity of opinions. Participants' answers ranged from 1 to 100% likelihood, recommendations of other participants (using a snowball sampling methodology). Participant affiliations included USG and former USG; academia; and nongovernmental, private sector, and industry organizations. The participants had responsibility for shaping public policy from ~3 to more than 45 years. Participant training and background included biological and nonbiological science, medicine, public health, national security, political science, foreign policy and international affairs, economics, history, and law. Of the 63 experts originally approached to participate, 62 completed the first round of the survey, and 59 completed the second round.





We also asked about types of biological agents likely to be used as weapons within the next 10 years. Participants felt that the likelihood of use was highest for biological toxins. This was followed by spore-forming bacteria, non–spore-forming bacteria, and viruses.

Participants generally did not think that fungi and prions were likely to be weaponized and felt that the likelihood of a synthetic pathogen being used as a weapon in the next 10 years was fairly low.

▶ **Read the full paper at source's URL.**

The History of Biological Weapons Use: What We Know and What We Don't

By W. Seth Carus

Source: http://online.liebertpub.com/doi/pdf/10.1089/hs.2014.0092

excellent

This article critically reviews the literature on the history of biological warfare, bioterrorism, and biocrimes. The first serious effort to review this entire history, made in 1969, had numerous limitations. In recent decades, several authors have filled many of the gaps in our understanding of the past use of biological agents (including both pathogens and toxins), making it possible to reconstruct that history with greater fidelity than previously possible. Nevertheless, there are numerous remaining gaps, and closer inspection indicates that some supposed uses of biological weapons never took place or are poorly substantiated. Topics requiring additional research are identified.

W. Seth Carus, *PhD, is Distinguished Research Fellow, Center for the Study of WMD, National Defense University, Ft. McNair, Washington, DC.*

EDITOR'S COMMENT: The best article on BWAs I have ever read!

How holographic computing could help train for disasters

Source: http://crisis-response.com/comment/blogpost.php?post=153

Microsoft has recently announced the release of **HoloLens,** the first holographic computer that allows users to interact, create, and explore with three-dimensional holograms within their physical environment. These high-definition lenses are wire- and cable-free, and feature spatial and sound recognition.

Users can control the device with simple and interactive gestures, and can interact with the hologram just as they do with physical objects. The holograms appear life-like and are able to move and change according to the interaction.

NASA is currently using the HoloLens to explore the surface of Mars. By taking images from the Mars rovers, NASA is able to view them as 3D holograms. This enables NASA employees to explore Mars without physically being there.

NASA's use of the HoloLens could be emulated in emergency medicine training. These holograms could be used to train healthcare professionals on medical practices that should be followed during any disaster. Just as NASA has the ability to physically explore Mars without being there, healthcare professionals could interact with virtual disaster scenarios – ones that mimic terrorist attacks or earthquakes, for example – via 3D holograms in

order to prepare for and understand such disasters better. Physicians would also be able to use these virtual scenarios to gain awareness of the skills necessary to practice in a disaster situation.

Disaster training is only one of the many useful ways HoloLens can be used for emergency medicine. In

the future, the HoloLens could be used for telemedicine by allowing the physician to interact and examine a patient during a time of disaster without physically being there. Biomedical engineers could use this technology to develop more customised technology to use in the

time of disaster. With its wide range of possible uses, this technology will ultimately open many doors to improve the field of emergency medicine.

Ebola may persist in wastewater for at least 8 days

Source: http://www.medicalnewstoday.com/articles/298593.php?tw

Aug 27 – New research finds that Ebola can survive in detectable concentrations in wastewater for 8 days - a finding that has implications for the disposal of contaminated liquid waste during epidemics and outbreaks.

The study, by researchers at the University of Pittsburgh, Drexel University - both in Philadelphia - and the National Institutes of Health (NIH), is published in *Environmental Science & Technology Letters*.

The current Ebola outbreak in West Africa is by far the worst since the disease first appeared in 1976. According to the latest World Health Organization (WHO) situation report, there have been 28,005 confirmed cases and 11,287 deaths to the virus since cases were first reported in March 2014.

In their background information, the authors note that in the wake of the outbreak, there remain significant questions on the appropriate handling of virus-contaminated liquid waste. One of these concerns is the persistence of Ebola in wastewater.

Studies have indicated that the virus can persist in survivors. For example, one study describes how viable Ebola virus was found in the eye of a survivor months after recovery.

In contrast, there is limited data on the fate and transport of Ebola in wastewater collection systems. Handling procedures from WHO and the Centers for Disease Control and Prevention (CDC) say Ebola-contaminated waste can be disposed of directly into the sewage system without additional treatment after a few days.

Lab experiments identified Ebola in wastewater after 8 days

However, the new study, conducted under secured NIH lab conditions, by microbial risk assessment and virology researchers, suggests these procedures might underestimate Ebola's ability to persist in wastewater, as study leader Kyle J. Bibby, assistant professor of civil and environmental engineering at Pittsburgh, explains:

"Initial research by the WHO and CDC recommended disposing of Ebola-contaminated liquid waste into a latrine or treatment system without disinfection because the virus wasn't expected to persist in wastewater. However, we found that the virus persisted over a period of at least 8 days."

Over the 8 days of their study, Prof. Bibby and colleagues measured changes in viral particle concentration in two samples contaminated with different concentrations of the virus.

Although the concentration dropped by 99% over the first day, they could still detect virus particles over the remaining 7 days.

This shows Ebola virus persists far longer in wastewater than previously thought. Although the virus was found to be less persistent than other enteric viruses, the researchers note the finding suggests there is potential for exposure through wastewater.

Ebola virus may be surviving in large droplets of bodily fluids

At first, scientists thought Ebola virus could only be transmitted through direct contact with bodily fluids, but cases in the current outbreak have occurred without such direct contact.

The researchers suggest this could mean that the virus is surviving in large droplets of bodily fluids - indicating more care should be taken in handling contaminated liquid waste. They note that an infected patient can produce up to 9 liters of liquid waste per day.

Finally, they comment on the virus' apparent early demise when it enters wastewater. Perhaps the virus does not decay - perhaps it evades detection by clumping together or attaching to other particles in the water. This would make it much harder to eradicate with disinfectants.

The WHO have already adopted procedures that hold liquid waste contaminated with Ebola for a longer period before releasing it into the sewage system.
Another potential solution might be to pretreat the waste with an antiviral chemical like chlorine, say the researchers, who also caution more information on how well this kind of disinfection might work is needed first.
Prof. Bibby says further research should now be done - that is not confined to the lab - to assess persistence of Ebola in liquid waste through all the steps of disposal and beyond. He concludes:
"These results indicate that further research is needed with a more holistic approach to assessment of Ebola-infected wastewater, from storage to treatment to disposal and continued monitoring, including a precautionary approach to wastewater handling in all epidemic responses."

Pentagon halts work with bioterror germs at 9 labs

Source: http://www.usatoday.com/story/news/nation/2015/09/03/pentagon-announce-moratorium-military-labs/71647118/

Sept 03 – The discovery of live anthrax outside a containment area at a military lab in Utah prompted military officials to order an immediate freeze on operations at nine biodefense laboratories that work with dangerous viruses, toxins and bacteria, the Pentagon announced Thursday.

The moratorium, first reported by USA TODAY, came after officials took a detailed look at policies and procedures at the labs and found them wanting, according to Defense officials. Labs at the Army's Dugway Proving Ground facility in Utah have been the focus of international concern since May, when the first clues emerged that the facility had been mistakenly shipping live anthrax — instead of killed specimens — to labs in the USA and abroad for years.
An ongoing USA TODAY Media Network investigation has revealed numerous safety problems at government, university and private labs that operate in the secretive world of biodefense research. Federal lab regulators are conducting comprehensive reviews of how they oversee lab safety and security.
Army Secretary John McHugh ordered the moratorium on the laboratories, including facilities run by the Army, Air Force and Navy. The Army is the top agency for the labs. McHugh acted out of an abundance of caution, according to the Army.
Activities at the labs will restart when the Army determines they can be conducted safely, said three military officials, who spoke on the condition of anonymity because they were not authorized to speak publicly. McHugh will have the authority to approve work if needed for national security.
McHugh issued his order for the sweeping safety review after lab regulators from the Centers for Disease Control and Prevention ordered Dugway Proving Ground's labs on Aug. 31 to suspend work with all types of "select agent" pathogens because of new revelations about sloppy biosafety practices at the Utah facility.
Dugway officials, in testing surfaces in their laboratories, detected anthrax bacteria on the floors of two rooms where staff had worked with the deadly pathogen. "If proper biosafety procedures had been followed, these surfaces should have been free of the agent," the CDC said in a statement in response to questions from USA TODAY. "Following the

suspension, the Department of Defense has begun an immediate safety review at all DoD labs and facilities involved in production, shipment and handling of live and inactivated select agents and toxins." The CDC said there is "no identifiable risk to the public" from the Dugway incident.

According to a memo issued Wednesday by McHugh, the safety review involves all labs involved in the production, shipment and handling of any live or inactivated pathogens that are designated as "select agents," because of their potential to be used as bioterror agents and the threat they pose to public health.

The review calls for the military labs to ensure that personnel are properly trained on lab safety procedures and that necessary maintenance is conducted on biosafety level 3 lab facilities that work with some of the most dangerous pathogens. It calls for validating record-keeping and inventories of the military's "Critical Reagents Program" — including "ensuring that all materials associated with the CRP are properly accounted for."

The Critical Reagents Program provides biological specimens used as reference materials to other DoD labs and to "interagency partners" for use in research and the evaluation of various biodefense products, according to the program's website. Pathogens listed in the program's catalog of antigens include the bacteria that cause plague and anthrax and Ebola and Dengue viruses. The catalog says the antigens listed are "an inactivated version of an entire organism or a toxin."

The memo calls for several of the labs to cease production and handling of any materials associated with the Critical Reagents Program.

Labs covered by the expanded moratorium include the U.S. Army Medical Research Institute of Infectious Diseases, the Edgewood Chemical and Biological Center, and the Naval Medical Research Center, which are all in Maryland.

A Bitter Pill: Fake Drugs and Global Health Security

By Dan Kaszeta

Source: http://ciceromagazine.com/opinion/a-bitter-pill-fake-drugs-and-global-health-security/

There is an emerging discourse in the security field regarding health security and how issues within the realm of defense intersect with public health. In my own career, having focused on biological warfare,

the overlap between weaponizing of viruses and bacteria and the effects and response of health authorities to disease outbreaks is apparent. In the era of swine and bird flu, SARS, and Ebola pandemics and the deployment of civilian and military personnel in response, it is clear that the threat to public health these afflictions represent is also a threat to national security. These international health threats receive much media attention. However, there is another threat to health security (and therefore national security) that receives less attention despite possibly having even more dangerous international repercussions: Fake drugs.

Not Just Ebola

Those of us working in the counter-terrorism and chemical, biological, radiological, and nuclear (CBRN) defense fields are awfully worried about things like Sarin, Anthrax, and Ebola. In truth, these are not going to kill us all and, even in worse case scenarios, they are not even likely to have a major effect on the vast majority of us, especially in the developed world. However, something like super-resistant tuberculosis spreading across North American and Europe or the return of drug-resistant malaria to areas where it had been eradicated should scare the hell out of us all.

It is important to keep threats like Ebola in proper perspective. Make no mistake: Ebola is a scary and lethal disease. But it has a basic reproductive number (the mathematical calculation of its ability to spread) that is quite low and Ebola outbreaks are most often stopped quickly if basic body substance isolation and infection control procedures are used. Ebola, a disease found

solely on the African continent, kills many. But it is illustrative to look at other causes of death in Africa which are responsible for many more casualties each year. People in Africa die from many other infectious diseases every year: HIV (1M+), diarrheal diseases (600K+), Malaria (500K+), Meningitis (240K+), Tuberculosis (200K+), and neonatal sepsis and infection (170K+), to name only the primary offenders on the list.

Millions of people in the developing world die each year from things that we in the developed world have eradicated, prevented, suppressed, or managed as causes of death. Much, but not all, of the credit goes to medicines like antibiotics, antivirals, and anti-parasitic drugs, either for prophylaxis or treatment. Safe sex, sanitation, pesticides, and other non-pharmaceutical measures play a key role as well, but injections, infusions, and pills are key armaments in the fight against infection disease.

Those who are faking these drugs in order to make quick money are opening the door for once-controlled diseases to adapt and overcome these treatments and create major global health security issues.

Today, HIV can be suppressed and the onset of lethal AIDS can be delayed indefinitely by the proper course of medication. Chemoprophylaxis is the longstanding method of preventing malaria. Infusion of fluids is life-saving in cholera. The only real way of curing tuberculosis is a lengthy course of drugs. The long-term and short-term uses of drug therapy in the developing world are too lengthy to enumerate here.

Disease Fights Back

But what happens when drug therapy is disrupted? What if supply from the chemical arsenal is delayed, obstructed, or otherwise not administered correctly? Bad things happen. Healthy people become sick. Sick people become sicker and some will die who might not have otherwise. Disease spreads, sometimes beyond its traditional endemic areas as populations move. Drug resistance develops. New strains of microbes and parasites develop. If Malaria returns to Europe due to climate change and other factors, we might all need more access to anti-malarial drugs.

Drug therapy can fail or be disrupted for many logistical, economic, or socio-cultural reasons. Another huge part of the problem is the supply of drugs is tainted by the presence of fake, diluted, substandard, counterfeit, and otherwise falsified drugs. I use many different terms here as there are wide-ranging disputes over words like “counterfeit” and “falsified” but I will use the phrase “fake medicine” as an inclusive term.

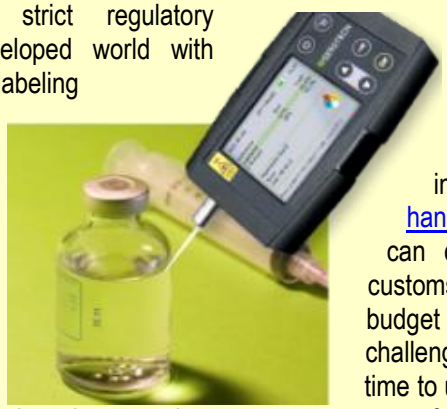
Fake drugs are looked at by some as a rich man’s disease – the exploitation of the middle classes by peddling fake erectile dysfunction drugs through dodgy online pharmacies. But the problem is more acute in the developing world. Worldwide, the trade in fake medicines was $75 billion in 2010, according to the World Health Organization. Some estimates place it even higher. Though only some 1% of the medicines in the developed world are fake or substandard, at least 30% of the medicines in the developed world are fakes. **A single 2013 World Customs Organization operation in Africa, Operation Biyela, netted over half a billion units of fake drugs in only 10 days.** While the fake medicine trade in Europe and North America is in branded medicines like Viagra, in the developing world much of the problem is fake generics. Faked pain killers, fake anti-inflammatories, fake antibiotics, fake anti-malarials, fake anti-retrovirals, are all cited in various studies and articles as acute problems across the developing world.

Scale of the Problem

Given both the scale of the fake medicine problem and the continued reliance on lengthy courses of drugs for both prophylaxis and treatment, it seems a mathematical certainty that fake medicines are contributing to illness and misery by making prevention and treatment more difficult. More disturbingly, many fake drugs have an element of the correct drug in them. Diluting one legitimate pill into ten or more doses is not an unknown tactic. Fake drugs, in turn, are probably aiding the rise of resistant strains of microbes and parasites. Introducing these evolving viruses, bacteria, and other forms of life to weak doses of the drugs

that supposed to kill them may be helping to make them stronger. This is a real threat. Those who are faking these drugs in order to make quick money are opening the door for once-controlled diseases to adapt and overcome these treatments and create major international health security issues.

The problem of fake drugs in the developing world is complicated by many factors. Poor access to information, muddled and convoluted distribution paths which allow for fake and real medicines to intermingle, poor enforcement by police and customs officials, and the desire for get a bargain all serve to allow the problem to proliferate. Nor are the major pharmaceutical producers doing all that they can to help. Having sat through several seminars on the subject, much of the major effort is expended on dealing with the strict regulatory requirements in the developed world with technologies like secure labeling and serialization of every packet. Africa, for example, is not the core of their revenue, so it is an afterthought. My impression from the major pharmaceutical presentations I have attended is that these efforts are more about brand protection, intellectual property rights, and revenue protection, and not so much about public health. Furthermore, much of the problem stems from fake generic drugs, where far less money is spent on anti-counterfeiting activities than the cash cows of major pharmaceutical companies.



The Response

There are things that can be done to combat this menace. Law enforcement and customs operations need improvement across the board in the developing world on many fronts, and not just in the area of fake goods. Patients need to be better informed. Rationalizing supply chains and distribution networks for legitimate medicines can help, although that task appears Herculean. Many of the conventional measures in packaging, labeling, and serialization that are in use by the major branded pharmaceutical firms could be applied to generic products, if enough effort were expended. The cost of doing so means generic drug makers are not likely to do it on their own.

Enforcement of regulations and the safety of patients can be further enhanced by verification tools. Some fakes are obvious to anyone with a smattering of education and training. But other fakes are very well made. The traditional approach is to send a suspect pill or vial to an analytical laboratory. But is that really a viable approach at the side of the road in, say, Cameroon? **Technology is now available to provide rapid analysis of medicines in the field.** Suitcase-sized devices have been available for some time, but their expense is daunting in the developed world. Handheld devices using Raman spectroscopy are available and getting cheaper all the time.

But "cheaper" is a relative term in scientific instrumentation. Even a cheaper handheld spectroscopic instrument can cost the same as hiring many customs officers or much of the operating budget of a health clinic. The big challenge is to find the right place and time to use such instruments and to find a way to pay for them in a way that will help all of us to keep bad things from happening to the whole world, not just poor people in the developing world.

Though the threat to global health security that fake drugs pose will likely never have as visible an impact as the victims of outbreaks of, say, Ebola, they can pose an even greater threat. Fake drugs or diluted doses could help diseases once considered contained—if only in the developed world—build resistance to medications. The health security of entire continents or the entire world could be placed and the impact of such a large-scale deterioration in health would have major repercussions for national security, all because some criminals want to make quick cash off the pain and suffering of others. That would indeed be a bitter pill to swallow.

Daniel Kaszeta *has over twenty years of diverse experience in the defense and security sectors with experience in the field of chemical, biological, radiological,*

and nuclear (CBRN) issues. He was a member of the U.S. Secret Service as a Senior Physical Security Specialist in the Technical Security Division and in the Chemical/Biological Countermeasures Branch. He is an independent consultant at Strongpoint Security and author of, CBRN and Hazmat Incidents at Major Public Events: Planning and Response.

Ebola virus mutations may help it evade drug treatment

Source: http://www.medicalnewstoday.com/releases/299461.php?tw

Sept 14 – **Genetic mutations called "escape variants" in the deadly Ebola virus appear to block the ability of antibody-based treatments to ward off infection,** according to a team of U.S. Army scientists and collaborators. Their findings, published online this week in the journal Cell Reports, have implications for the continued development of therapeutics to treat Ebola virus disease, which has claimed the lives of over 11,000 people in West Africa since last year.

Ebola virus overruns the immune system, thus overwhelming the host's ability to fight off the infection. One strategy for treatment is based on the administration of a "cocktail" of antibodies that have the ability to neutralize the virus and allow the host to mount an effective immune response. One such cocktail, known as MB-003, has demonstrated efficacy in nonhuman primates infected with the virus. MB-003 and ZMAb were early formulations used in proof-of-principle trials that led to the more advanced formulation, ZMapp, currently in development and authorized for compassionate use in the West African Ebola outbreak response.

To understand the reasons for the improvement, investigators at the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) Center for Genome Sciences (CGS) examined nonhuman primates that succumbed to Ebola virus despite being treated with MB-003 one or two days post-infection. Viral nucleic acids were isolated from blood samples drawn at multiple time points and were sequenced to provide a description of the viral population. This approach is routinely utilized at USAMRIID to study the development of viral therapeutic resistance against antiviral countermeasures, according to Dr. Gustavo Palacios, director of the center and senior author of the study.

Two clusters of changes in the viral genome were observed in one of the animals that succumbed. Several of those changes corresponded with the viral target sites of two of the cocktail's antibodies, triggering an in-depth molecular analysis of the development and impact of those changes.

"The molecular analysis allowed us to see where the cocktails were inducing changes in the genome, and to link those changes to the treatment failure," said co-first author CPT Jeffrey Kugelman, Ph.D., of USAMRIID. Based on these findings, tissues at selected time-points were used for viral isolation, which finally allowed the "rescue" of the mutated virus.

"When this rescued virus was sequenced, we observed that the clusters of changes had progressed from affecting a small portion of the viral population to becoming mutations--permanent changes in the genome--without disrupting any major viral functions, including the ability to cause infection."

Subsequently, the rescued virus was tested for neutralization against the cocktail and its individual components, demonstrating the inability of the therapeutic to control replication.

"At this point, we knew that the mutations were, in fact, 'escape variants' that were cumulatively responsible for reduced efficacy of the MB-003 therapeutic," Palacios said. "However, we were unsure of the frequency of this type of event."

To help answer that question, the scientists analyzed other independently conducted but similarly designed studies of MB-003.

"We were able to identify, using the same tools, a second animal with a similar pattern of changes," Kugelman noted. "Strikingly, the two animals had four sites in common. This information leads us to believe that these sites are under 'selection pressure' by the therapeutic, meaning that the antibody cocktail binds and promotes elimination of the original virus, while the escape variants continue the infection."

Palacios added that further work is needed to document each individual mutation's effect on each of the three antibodies.

"Our research has already established that a few amino acid changes may be sufficient to erode the binding of multiple antibodies in a cocktail," he said. "It would be very important to determine which changes have a direct impact on binding."

The team's findings highlight the importance of selecting different target domains for each component of the therapeutic cocktail to minimize the potential for viral escape, according to the authors. Two of the antibodies in the MB-003 cocktail target a related region of the Ebola virus glycoprotein, and thus are more susceptible to localized changes affecting multiple antibodies. Furthermore, these findings are important for scientists studying Ebola virus to provide a basis for how quickly the virus can adapt to therapeutics. This rate will be important for predictive models of therapeutic resistance.

Ebola virus causes severe hemorrhagic fever in humans and nonhuman primates with high mortality rates and continues to emerge in new geographic locations, including West Africa, the site of the largest outbreak to date. Over 28,000 confirmed, probable and suspected cases have been reported in Guinea, Liberia and Sierra Leone, with more than 11,000 reported deaths, according to the World Health Organization.

Anthrax spores: Environmental factors in survival

Source: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0138083

There is a lack of data for how the viability of biological agents may degrade over time in different environments. In this study, experiments were conducted to determine the persistence of *Bacillus anthracis* and *B. subtilis* spores on outdoor materials with and without exposure to simulated sunlight, using ultraviolet (UV)-A/B radiation. Spores were inoculated onto glass, wood, concrete, and topsoil and recovered after periods of 2, 14, 28, and 56 days. Recovery and inactivation kinetics for the 2 species were assessed for each surface material and UV exposure condition. Results suggest that with exposure to UV, decay of spore viability for both Bacillus species occurs in 2 phases, with an initial rapid decay, followed by a slower inactivation period. The exception was with **topsoil, in which there was minimal loss of spore viability in soil over 56 days, with or without UV exposure**. The greatest loss in viable spore recovery occurred on glass with UV exposure, with nearly a 4 log10 reduction

after just 2 days. In most cases, *B. subtilis* had a slower rate of decay than *Bacillus anthracis* although less *B. subtilis* was recovered initially.

Introduction

Following the intentional release of virulent *Bacillus anthracis* spores via the United States Postal Service in 2001, a need for effective remediation methods has emerged. Inactivation of biological agents through natural attenuation processes may be a potential option for remediation of contaminated outdoor areas following a wide area bioterrorism event, depending on the type of microorganism, and environmental conditions. For example, bacterial spores are most resistant to viability decay in the environment, whereas vegetative bacteria are least resistant, and the sensitivity of viruses to environmental conditions is intermediate. Further, since ultraviolet radiation (UV) in sunlight is bactericidal, exposure to solar radiation could limit bacterial spore (such as those of *Bacillus anthracis*) persistence in the environment. However, there is a lack of data and a need for predictive understanding of biological agent viability in different environments.

Historically, most laboratory studies of Bacillus spore photochemistry and resistance mechanisms have used 254 nm UV radiation (UV-C), as this wavelength was predominantly tested because of its germicidal properties. However, natural solar radiation, or sunlight, is considerably more complex than this monochromatic 254 nm UV wavelength. Solar radiation is a mixture of UV, visible, and infrared radiation, with only those UV wavelengths longer than 290 nm reaching the Earth's surface. That is, solar UV radiation reaching the Earth's surface is comprised of both UV-A (380-320 nm) and UV-B (320-290 nm) regions, with no UV-C (less than 290 nm). Given that UV-B is more environmentally relevant than UV-C, and DNA damage occurs directly

through the absorption of energy from solar radiation, more recent studies have focused on bacterial spore resistance to solar radiation, using either natural sunlight or exposure in a laboratory setting to solar radiation components UV-A and/or UV-B. However, because these studies used *B. subtilis* spores, the relevance of the resulting data to virulent *Bacillus anthracis* spores is unknown.
The primary objective of this study was to investigate the effect of simulated sunlight (UV-A/B) on the inactivation kinetics of virulent *Bacillus anthracis* Ames spores and *B. subtilis* spores, a potential avirulent surrogate. Although a few primary studies and reviews have examined the inactivation of dried Bacillus spores on surfaces due to UV, none have used a virulent *Bacillus anthracis* strain in combination with natural or simulated sunlight. Further, the present study used realistic materials that are commonly found outside and exposed to natural sunlight. (Most biological agent persistence studies fail to account for the effect of materials or environmental matrices.) Previous results suggest that a material's pore structure and texture may shield and provide physical protection to the spores from UV radiation. Therefore, the current study used Bacillus spores dried onto both non-porous and porous materials, to determine their resistance to simulated sunlight.

This article is dense with information and so needs reading in full by those interested. The authors are to be commended. But one should remember that it deals with events soon after a surface contamination (no more than 8 weeks) and where there is the benefit of U/V light. Those competing with laboratory contamination do not have this advantage.
That anthrax spores survive well in soil for the 1st 8 weeks is not new knowledge. I well remember Max Sterne telling me in 1972 that in his experience in Natal in the 1930s he found that **soil would stay contaminated from a carcass for 3 months to 3 years**; experience has borne him out. When you bury the carcass spore survival is prolonged.
If you are handling *Bacillus anthracis* in a laboratory, swab down and disinfect as you go, with a more rigorous clean at the end of the week. And remember it can fly whether dropped in a laminar flow cabinet, on the bench, or on the floor, or when opening an agitated flask. Remove clutter. And routinely check that you are clean by swabbing and plating out your swabs on blood agar. Yes, it is a pain but who wants to join the Detrick and Dugway fraternity.

Wood JP, Meyer KM, Kelly TJ, et al: Environmental Persistence of Bacillus anthracis and Bacillus subtilis Spores. PLoS ONE 10(9): e0138083. doi:10.1371/journal.pone.0138083

The bacteria-fighting super element that's making a comeback in hospitals: copper

By Lena H. Sun
Source: https://www.washingtonpost.com/national/health-science/the-bacteria-fighting-super-element-making-a-return-to-hospitals-copper/2015/09/20/19251704-5beb-11e5-8e9e-dce8a2a2a679_story.html

Ancient Egyptians used copper to sterilize chest wounds and drinking water. Greeks, Romans and Aztecs relied on copper compounds to treat burns, headaches and ear infections. Thousands of years later, the ancient therapeutic is being embraced by some hospitals because of its ability to kill bacteria and other microbes on contact, which can help reduce deadly infections.

At least 15 hospitals across the country have installed, or are considering installing, copper components on "high-touch" surfaces easily contaminated with microbes — faucet handles on sinks, cabinet pulls, toilet levers, call buttons and IV poles.

"We've known for a long time that copper and other metals are effective in killing microbes, so it wasn't a great leap to incorporate copper surfaces into hospitals," said John Lynch, medical director of infection control at Seattle's Harborview Medical Center, which is redesigning a waste-disposal room to incorporate copper on light switches and door handles.
For many hospitals, the death of Ebola patient Thomas Eric Duncan last year at a Dallas

hospital heightened concerns — two nurses caring for him caught the virus because of poor infection control. And even before that, public health officials had identified nearly two dozen dangerous pathogens — many of them resistant to virtually all antibiotics — whose spread in health facilities and elsewhere could result in potentially catastrophic consequences.

Queenster Nartey counts bacterial colonies in a non-copper sink sample as part of research on copper's role in reducing infections. (Justin Hayworth/Grinnell College)

They include MRSA, a potentially deadly infection that is increasing in community settings; VRE, which can cause a variety of infections; and C. diff, which causes life-threatening diarrhea and sends 250,000 people to the hospital every year.

On any given day, about 1 in 25 patients in acute-care hospitals has at least one health-care-associated infection, according to the Centers for Disease Control and Prevention. Pneumonia and surgical-site infections are among the most common. **In 2011, about 75,000 patients with health-care-associated infections died in the hospital.**

Hospital officials aren't the only ones interested in copper. Hartsfield-Jackson Atlanta International Airport installed drinking fountains retrofitted with antimicrobial copper surfaces. In Colorado Springs, the U.S. Olympic Committee's flagship training center uses custom dumbbells with antimicrobial copper grips. So do two professional hockey teams, the Los Angeles Kings and St. Louis Blues. Even a Chick-fil-A in Morganton, N.C., installed antimicrobial copper on restroom door handles.

Copper can kill or inactivate a variety of pathogens by interacting with oxygen and modifying oxygen molecules. In bacteria, this disrupts the outer layer, damaging the genetic material and cell machinery, which can lead to cell death. A recent study found that copper also destroys norovirus.

There has been only one published clinical trial showing how copper reduces infections in hospitals. The results, however, were striking: Researchers said the study, which took place between July 2010 and June 2011, showed that copper surfaces reduced infection rates by 58 percent.

Now, the CDC is pressing for more research. Last week, it held a roundtable on environmental infection control in preventing Ebola and other health-care-associated infections. Officials, who are exploring copper and other technologies, are working with hospitals, academics and the copper industry.

The Defense Department, which funded the first clinical trial on copper and hospital-acquired infections, is researching copper's effectiveness against one type of bacteria, acinetobacter, which can cause pneumonia or bloodstream infections among critically ill patients, including wounded soldiers returning from the battlefield.

Many experts have concluded that traditional methods for reducing hospital-acquired infections, such as hand washing, aren't enough, because people don't always do what they are supposed to do and many pathogens can survive for long periods on surfaces. That's why hospitals are experimenting with other ways to destroy them, including using ultraviolet light and hydrogen peroxide vapor to target germs in nooks and crannies not easily reached by cleaning crews.

But those measures require actions by human beings — which is not the case with copper.

"It's always working, it requires no human intervention, no supervision, and it's acting continuously," said Michael Schmidt, a microbiology professor at the Medical University of South Carolina and one of the researchers who conducted the first and largest study of copper surfaces in hospitals.

Besides the South Carolina hospital, the study involved Memorial Sloan Kettering Cancer Center in New York and the Veterans Affairs hospital in Charleston, S.C. About 600 patients who were admitted to the intensive-care units at the facilities were randomly assigned to receive care in traditional patient rooms or ones in which six frequently touched objects — such as bed rails, tables, IV poles and nurse call buttons — were made from copper alloys.

While welcoming the findings, researchers said additional studies are needed to answer many questions.

"Is there a minimal risk number out there — how many bacteria on a surface to really put people at risk?" said L. Clifford

McDonald, a medical epidemiologist at the CDC.

"Right now, there's not enough data on copper or other technologies to make firm recommendations on what hospitals should do," he said. In the meantime, facilities should continue to thoroughly clean patients' rooms and supplement that with disinfectants. And everyone, especially health-care workers, should wash their hands with soap and water.

At an American Hospital Association conference in July, Todd Linden, chief executive of Grinnell Regional Medical Center in Iowa, gave a 70-minute presentation on copper items installed in 13 of the hospital's patient rooms. The 49-bed facility also plans to use copper in renovating its emergency room. Grinnell College biology professor Shannon Hinsa-Leasure is conducting a clinical trial on the hospital's use of copper. The hospital's fitness center also has copper components, including on its free weights. Olin Brass and its manufacturing partners donated products for the hospital; community donations paid for the fitness center.

Cost is an issue. Adding copper surfaces is about 15 to 20 percent more expensive than using traditional stainless steel. But the long-term benefits are worth it, Linden and Schmidt say.

A typical U.S. hospital room contains about $100,000 of goods and equipment, experts say. The average cost to outfit a hospital room with antimicrobial copper items is about $5,000, Linden said. But one infection adds $43,000 in patient costs, according to federal data. And under the Affordable Care Act, hospitals with higher infection rates and other patient injuries face decreases in their Medicare reimbursements.

The copper industry, meanwhile, provided financial help to several facilities interested in experimenting with copper surfaces.

The Copper Development Association gave $50,000 in grants to four hospitals in 2013 and 2014, said Adam Estelle, a project engineer with the trade group.The association began promoting copper's antimicrobial properties in 2008, when several groups of copper products met standards of the Environmental Protection Agency to be registered as antimicrobial and effective in killing six types of bacteria, including MRSA, VRE and the deadly E. coli 0157 strain, the culprit in numerous food recalls, illnesses and deaths.

Pullman Regional Hospital in Washington state received a $10,000 grant from the copper industry group two years ago. The 26-bed hospital bought more than 1,200 cabinet drawer pulls and 22 handicapped-access buttons on doors.

Ed Harrich, chief of surgical services, and his staff have been methodically installing the hardware. He persuaded hospital administrators to approve another $10,000 for more items.

"If you looked at my cabinet pulls, they look like stainless steel, but we still get copper's killing properties," he said. "We're still continuing to clean everything we can. But this is our little helper behind the scenes."

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Former peanut company owner to jail for 28 years for fatal 2009 salmonella outbreak

Source: http://www.homelandsecuritynewswire.com/seworld20150922-former-peanut-company-owner-to-jail-for-28-years-for-fatal-2009-salmonella-outbreak

Sept 22 – **In a rare instance of a prison sentence in a food contamination case, Stewart Parnell, the former owner of Peanut Corporation of America, was sentenced to twenty-eight years in prison for his role in a 2009 salmonella outbreak which killed nine people and sickened hundreds.**

Parnell, 61, who once managed the Peanut Corporation of America, and his brother, Michael Parnell, who was a food broker for the company, were convicted on Monday on federal conspiracy charges for knowingly shipping salmonella-tainted peanuts to customers.

Contamination at the company's plant in Blakely, Georgia, resulted in one of the largest food recalls in U.S. history, and drove the company into liquidation.

Federal investigators who checked the Georgia facility found a leaky roof, roaches, and evidence of rodents, all ingredients for breeding salmonella. They also uncovered e-mails and records showing food confirmed by lab tests to contain salmonella was shipped to customers.

USA Today reports that U.S. district judge Louis Sands gave Michael Parnell twenty years in prison. Mary Wilkerson, a former quality control manager at the plant who was convicted of obstruction of justice, was sentenced to five years in prison.

Sands also ordered both Parnells to surrender, rejecting defense arguments that the two should be allowed to remain free on bond pending appeals. The judge deemed them potential flight risks.

Before being sentenced, Stewart Parnell said: "This has been a seven-year nightmare for me and my family. I'm truly, truly sorry for what's happened."

Jeff Almer, of Brainerd, Minnesota, whose mother died from eating tainted peanut butter, was among those who told Judge Sands that the Parnells should receive stiff prison time.

"My mother died a painful death from salmonella, and the look of horror on her face as she died shall always haunt me," said Almer. "I just hope they ship you all to jail."

During the seven-week trial last year, prosecutors said the Parnell brothers covered up the presence of salmonella in the company's peanut products for years, going so far as to create fake certificates showing that the company's products were uncontaminated even though laboratory test results showed otherwise.

The Parnells have insisted they never knowingly endangered customers, and people who spoke on their behalf asked a judge to show mercy.

"No one thought that the products were unsafe or could harm someone," said Stewart Parnell's daughter, Grey Parnell. "Dad brought them home to us. We all ate it."

Official with the Centers for Disease Control and Prevention testified at the trial that the company's peanut products made 714 people ill in 46 states, including 166 who were taken to hospital.

William Marler, a Seattle-based food safety lawyer who represented many families of victims in the salmonella outbreak, characterized the prospect of a life sentence for Stewart Parnell as "unprecedented." But he said it was not necessarily surprising in light of the evidence.

Marler called the outcome "a big step forward" in a telephone interview after the court proceeding.

"This sentence is going to send a stiff, cold wind through board rooms across the U.S.," Marler tweeted.