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DIRTY R-NEWS

SIGMA Program Completes Testing of Ambulance-Mounted 'Dirty Bomb' Detectors

Source: https://cbrnecentral.com/sigma-program-completes-testing-ambulance-mounted-dirty-bomb-detectors/10627/

March 2017 – The largest test deployment of vehicle-mounted radiation detectors was successfully completed by the Defense Advanced Research Projects Agency (DARPA) SIGMA program last month in Washington, D.C.

Beginning in July 2016, D.C. Fire and Emergency Medical Services ambulances were outfitted with DARPA-developed nuclear and radiological detectors, providing the first city-scale, dynamic, real-time map of background radiation levels throughout the Capital as well as identifying any unusual spikes that could indicate a threat.

Emergency vehicles equipped with radiation detectors provide an excellent means of achieving a large-scale scan for radiological risks. In the just-completed test deployment, up to 73 large detectors were installed on emergency vehicles that together logged well over 100,000 hours of detector operation covering more than 150,000 miles, and identified in real-time thousands of radiation sources.

Items as innocuous as natural granite used in construction, as well as lingering radiation after certain medical treatments, can trigger positive responses. SIGMA detectors can readily distinguish between these kinds of benign sources and threatening ones.

In addition, the SIGMA detectors provided detailed background radiation maps of the District against which future sources may be more easily detected.

The deployment also offered an opportunity to test and refine the wireless data fusion aspects of the system, which constantly fed information about vehicle location and radiation readings to a central command post.

"D.C. Fire and EMS was an invaluable partner and testbed for SIGMA's vehicle-scale detectors," said Vincent Tang, DARPA program manager. "The data gathered during the D.C. deployment are helping to further fine-tune the SIGMA system for potential deployment in major cities across the country and for emergency use by active-duty military units and National Guard civil support teams." While ambulances were used in the D.C. test, the program envisions the possibility of using other options for getting distributed coverage in future deployments in other cities.

EDITOR'S COMMENT: Great idea!

IAEA Reviews Canada's Emergency Preparedness and Response for Nuclear Emergencies

Source: https://www.hstoday.us/subject-matter-areas/emergency-preparedness/iaea-reviews-canadas-emergency-preparedness-and-response-for-nuclear-emergencies/

June 15 – An International Atomic Energy Agency (IAEA) team of experts has concluded an 11-day mission to review Canada's Emergency Preparedness and Response (EPR) framework for nuclear and radiological emergencies. The Emergency Preparedness Review (EPREV) was carried out at the request of the Canadian government.

The mission focused on preparedness for emergencies stemming from events at nuclear power plants. Canada operates 19 reactors at four sites, generating about 15 percent of its electricity. Canada also develops and exports reactor technology.

Michael Scott, Director of the Division of Emergency Preparedness and Response in the Office of Nuclear Security and Incident Response of the U.S. Nuclear Regulatory Commission, led the 11-person review team, which also included experts from Australia, Finland, France, Germany, the Republic of Korea, Romania, South Africa, Sweden and the IAEA.

"Preparations by the Canadian government for this review were clear, focused and effective," said Scott. "The findings of this mission will help Canada to further enhance its EPR system."

IAEA Deputy Director General Juan Carlos Lentijo, Head of the Department of Nuclear Safety and Security, noted that Canada was the first country with a large nuclear power programme to host an EPREV. "I hope others will follow suit," Lentijo said.

EPREV missions are one of the peer reviews offered by the IAEA to strengthen nuclear safety in Member States. EPREV missions focus on the arrangements and capabilities to prepare for and respond to nuclear and radiological emergencies. EPREV missions are based on the IAEA safety standards in nuclear and radiological emergency preparedness response.

The EPREV team identified several strengths in Canada's EPR framework, including a well-developed and mature EPR system in place across all levels of government, as well as a streamlined approach for the timely processing of liability claims relating to nuclear or radiological emergencies.

The team also made suggestions to strengthen emergency preparedness and response, including:

- Develop a detailed monitoring strategy to optimize the use of monitoring capabilities and resources.

- Include justification and optimization in the protection strategy.
- Develop detailed arrangements for formally terminating a nuclear emergency.

The Canadian government intends to develop an action plan to address the recommendations and suggestions in the report and to host a follow-up EPREV mission in approximately two to four years. The government plans to make the report public upon completion in early 2020.

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NUCLEAR NOTEBOOK

Chinese nuclear forces, 2019

Hans M. Kristensen and Matt Korda

ABSTRACT
The Nuclear Notebook is researched and written by Hans M. Kristensen, director of the Nuclear Information Project with the Federation of American Scientists, and Matt Korda, a research associate with the project. The Nuclear Notebook column has been published in the *Bulletin of the Atomic Scientists* since 1987. This issue's column examines China's nuclear arsenal, which includes about 290 warheads for delivery by ballistic missiles and bombers. This stockpile is likely to grow further over the next decade, and we estimate that China will soon surpass France as the world's third-largest nuclear-armed state.

KEYWORDS
China; nuclear weapons; ICBM; SLBM; IRBM; SSBN; H-6

Source: https://www.tandfonline.com/doi/pdf/10.1080/00963402.2019.1628511

Hans M. Kristensenis *the director of the Nuclear InformationProjectwith the Federation of American Scientists inWashington, DC. His work focuses on researching and writingabout the status of nuclear weapons and the policies thatdirect them. Kristensen is a co-author of the world nuclearforces overview in theSIPRI Yearbook(Oxford University Press)and a frequent adviser to the news media on nuclear weap-ons policy and operations. He has co-authored NuclearNotebook since 2001.*

Matt Kordais *a research associate for the Nuclear InformationProjectat the Federation of American Scientists, where he co-authors the Nuclear Notebook with Hans Kristensen.Previously, he worked for the Arms Control, Disarmament,and WMD Non-Proliferation Centre at NATO headquarters inBrussels. He received his MA in International Peace andSecurity from the Department of War Studies at King'sCollege London, where he subsequently worked asa Research Assistant on nuclear deterrence and strategic sta-bility. Matt's research interests and recent publications focuson nuclear deterrence, missile proliferation, gender main-streaming, and alliance management, with regional concen-trations on Russia and the Korean Peninsula. He is a 2018alumnus of IGCC's Public Policy and Nuclear Threats BootCamp and a 2019 CSIS Nuclear Scholar*

Why thorium is a safer nuclear option

By Quamrul Haider

Source: https://www.thedailystar.net/opinion/environment/news/why-thorium-safer-nuclear-option-1761280

June 24 – The picture is crystal clear. Human activity will soon drive the climate crisis all across our planet to the tipping point unless we rapidly transform the ways in which we produce and consume energy. While renewable energy technologies and energy efficiency measures can help dramatically cut emissions of greenhouse gases, they are not the panacea for the climate change related problems that we have created.

The scope and impacts of climate change, therefore, demand that we consider other possible low or zero greenhouse-gas-emitting sources of energy, including nuclear power. Indeed, nearly every major authority on climate change, including the International Energy Agency and the UN's Intergovernmental Panel on Climate Change (Fourth Assessment Report), has said that to achieve deep decarbonisation, nuclear energy must be part of the solution.

All nuclear power plants in operation today rely on controlled fission, which involves neutron-induced splitting of one of the isotopes of uranium into two lighter fragments and two or three neutrons. Despite being a clean source of energy, there exists bitter controversy

surrounding the risks of harnessing energy released during fission. Some of the risks are c ore meltdown (as seen in the 2011 Fukushima disaster), hazards of disposing of radioactive waste, harmful effects of radiation and nuclear proliferation. These risks have made nuclear power a contentious topic bordering between our greatest hopes and deepest fears for the future.

If fission-based nuclear power plants are to play a major role in combating global warming, then we want them to be free from fears of a catastrophic, runaway chain reaction. Even more, we want a nuclear fuel that would produce manageable amounts of radioactive waste. We also want a fuel that does not possess the threat of falling into the wrong hands and becoming a deadly weapon of mass destruction.

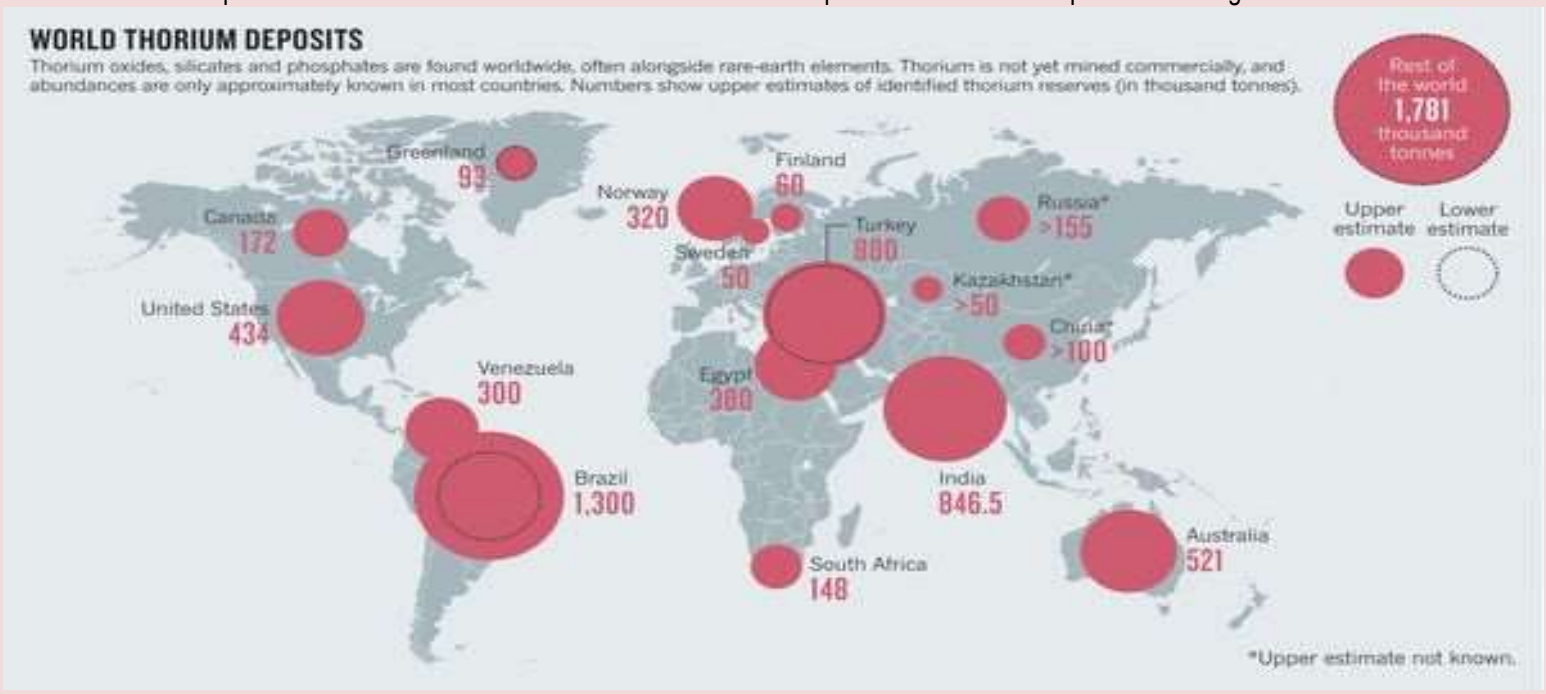
Many countries are addressing the worrisome problems associated with uranium-fuelled reactors and exploring the possibilities of other forms of safe, clean and incontrovertible nuclear fuel. An alternative that is receiving serious attention from the nuclear stakeholders is using thorium, instead of uranium, as nuclear fuel.

Thorium is a non-fissile, "fertile", slightly radioactive element. Being non-fissile, it cannot be split to create a nuclear chain reaction, so it must be bred through nuclear reactors to produce fissile uranium.

Thorium enjoys several advantages over uranium. First, the risk of nuclear proliferation of thorium is less than that of uranium. This comes mostly from the fact that plutonium, an essential

ingredient of nuclear weapons, is not produced in thorium reactors. Thorium fuel cycle would also minimise toxicity and decay heat problems associated with current reactors.

Secondly, in the event of a runaway chain reaction, uranium-based reactors have the potential to become supercritical and get out of control, thereby causing a catastrophic accident. Since thorium reactors would operate sub-critically, runaway chain reactions that cause nuclear meltdowns would not occur.



Thorium has other advantages too. The inventory of radioactive waste produced by thorium would be much less than uranium. A thorium reactor burns nearly all of its fuel. As a result, it will produce less waste. While some trace elements in spent uranium fuels remain radioactive for many thousands of

years, levels in spent thorium fuels drop off much faster. Moreover, unlike conventional reactors that run at potentially explosive, pressurised environments at much higher temperatures, thorium-fuelled reactors can be operated at atmospheric pressure.

Thorium reactors use a combination of thorium and liquid fluoride salts to power the reactor. Fluoride salts have very high boiling points, meaning even a large spike in heat will not cause a massive increase in pressure. This feature greatly limits the chance of a containment explosion. Besides, the reactors don't require massive cooling, meaning they can be placed anywhere and can be air-cooled.

Thorium is roughly three-four times more abundant in nature than uranium. The most common source is a mineral called monazite, which contains about 12 percent thorium phosphate. Large known deposits are in India, Australia and Norway. Some of the largest reserves are found in Idaho in the USA.

With large, easily accessible reserves of thorium and relatively little uranium, India has made utilisation of thorium for large-scale energy production a major goal in its nuclear power programme. The country has successfully developed a thorium fuel cycle at the nuclear power plant in Kalpakkam, Tamil Nadu. China hopes to build a fully functional thorium-fuelled reactor within the next 10-15 years. Norway is currently in the midst of testing thorium as a fuel in existing nuclear reactors. Other countries with active thorium research programmes include the United Kingdom, Canada, Japan, Germany, Russia and Israel.

If thorium is a safe and versatile nuclear fuel, then why do we use unsafe uranium? The real reason we use uranium over thorium is a result of the Cold World-era politics. Nuclear superpowers backed uranium-based reactors because they produce plutonium—handy for making nuclear weapons. The fact that thorium reactors fail the weapon-making test meant the better reactor fuel got the short shrift.

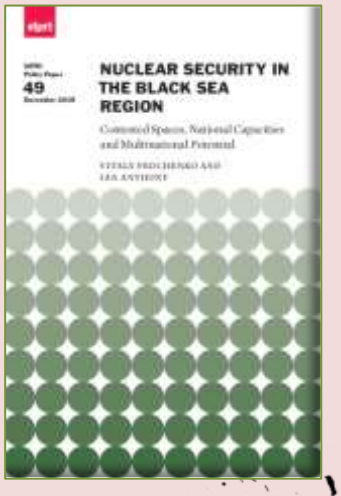
Nevertheless, if the choice is between keeping nuclear power facilities running or shutting them down and replacing them with coal-fired power plants, the nuclear option with thorium as fuel is ideal for the climate. It is the best supplement to sustainable green energy, filling the gap until nuclear fusion reactors are built. (In an op-ed piece published in this newspaper on May 26, 2019, I discussed fusion energy as the safest form of nuclear energy.)

Finally, regardless of the fear among the public and many activists about nuclear power, thorium reactors are a safer, realistic solution to humanity's greatest problem. Without nuclear power, we would foreclose our ability to avert the environmental disaster that we brought upon us.

Quamrul Haider *is a professor of physics at Fordham University, New York. He is one of the authors of the book* **Nuclear Fusion—One Noble Goal and a Variety of Scientific and Technological Challenges** *(IntechOpen, 2019, UK).*

Nuclear security in the Black Sea region: Contested spaces, national capacities and multinational potential

By Vitaly Fedchenko and Dr Ian Anthony



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December 2018 – Some of the most significant known cases of illicit trafficking of nuclear materials have taken place in the wider Black Sea region. Recent events in the region—in particular in Ukraine—make it important to understand whether nuclear security risks have worsened or multiplied as a consequence.

This SIPRI Policy Paper offers a comprehensive overview of perceptions of nuclear security risks in the wider Black Sea region, along with a detailed assessment of how the level and nature of those risks have changed in Ukraine since 2014. The authors examine the measures that the states in the region are taking to manage nuclear security

risk today and consider what steps might be taken to enhance the effectiveness of their actions. They pay special attention to risks arising from contested spaces, where regulations are impossible to implement and where it is difficult to maintain awareness of the changing conditions on the ground.

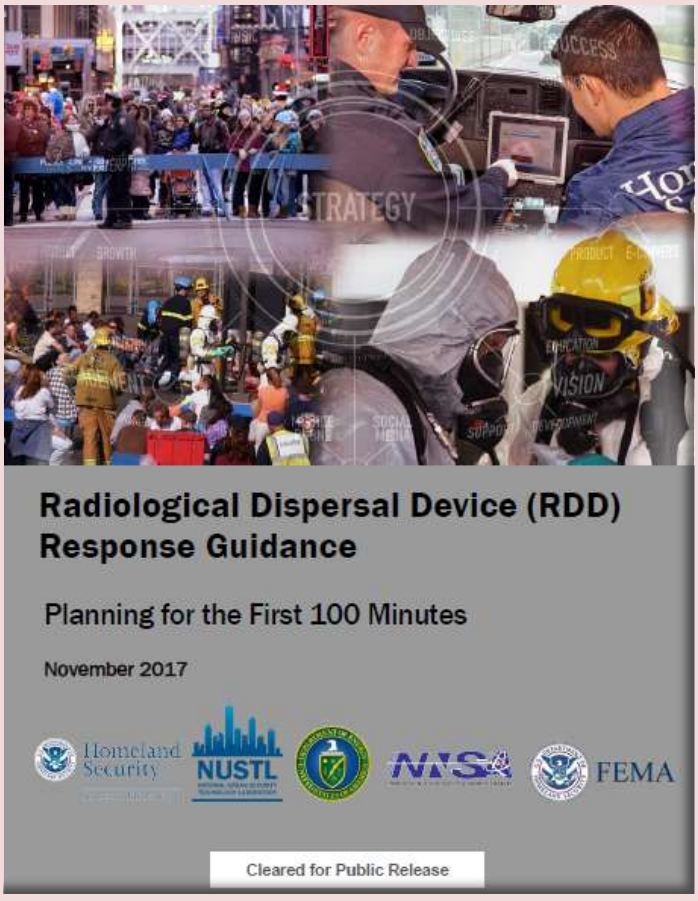
Contents

Vitaly Fedchenko *is a Senior Researcher with the SIPRI European Security Program.*
Dr Ian Anthony *is the Director of the European Security Program.*

First Responder Radiological Preparedness

Source: http://www.homelandsecuritynewswire.com/dr20190703-first-responder-radiological-preparedness

July 03 – A radiological dispersal device (RDD), or "dirty bomb," detonation in a local jurisdiction will have significant consequences for public safety, responder health and critical infrastructure operations. First responders and emergency managers must quickly assess the hazard, issue protective action recommendations, triage and treat the injured, and secure the scene in support of the individuals, families and businesses in the impacted community. This is why, in 2017, the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) National Urban Security Technology Laboratory (NUSTL), in partnership with the Federal Emergency Management Agency (FEMA) and the Department of Energy (DOE) National Nuclear Security Administration (NNSA) published guidance for first responders and emergency managers on how to plan for the first minutes of an RDD detonation response.



S&T says that the Radiological Dispersal Device Response Guidance Planning for the First 100 Minutes is the result of years of scientific research and experimentation conducted by DOE laboratories – Brookhaven National Laboratory (BNL) and Sandia National Laboratories – coupled with S&T NUSTL's direct conversations with first responders about operationalizing and documenting the scientific recommendations. The Guidance includes five missions and ten tactics to address initial response efforts. It is intended to be engaging and easy to use, allowing communities to plug in their specific assets, agencies and response protocols. "The Guidance provides emergency planners and first responders across the nation with a playbook of best practices to start from in planning for a RDD detonation response," said Ben Stevenson, Program Manager at S&T NUSTL.

Now that the Guidance is published, S&T's NUSTL is leading efforts to make it accessible to the responder communities who will need to incorporate it into their planning efforts and to state and federal partners that will support the response.

Animating the guidance

To support responder understanding of the missions and tactics described in the RDD Response Guidance, S&T's NUSTL worked with DOE's Lawrence Livermore National Laboratory to animate the missions and tactics. Using a realistic RDD detonation scenario, the team developed short training clips that can be used to:

- Instruct response actions;
- Show appropriate personal protective equipment; and
- Provide realistic radiological readings that responders may see during a response.

These are available on S&T's website and also on the RadResponder platform.

Training the nation

S&T's NUSTL is working with several organizations to disseminate the key missions and tactics of the Guidance as well as the animations to responders across the nation. On the immediate horizon are:

1. The development of a train-the-planner course for emergency planners training federal personnel located regionally across the country who support state and local activities;
2. The publication of templated RDD detonation exercise materials that first responders, Weapons of Mass Destruction Civil Support Teams (WMD-CSTs) and other partners can use individually or collaboratively.

On the first effort, S&T's NUSTL, FEMA's National Training and Education Division, and the Counterterrorism Operations Support Center for Radiological Nuclear Training are designing a training specifically for emergency planners who are generally responsible for writing and organizing emergency response plans for local communities. This train-the-planner course will be offered as a mobile course and yield the basis of an RDD response plan for a local community. This course will be piloted in the coming year before it is finalized within the FEMA course catalog in 2021.

"Partnering with other agencies to develop and deliver the train-the-planner course brought together expertise from across the nation to ensure the training course will meet the objectives," said James Dansby, Program Manager at FEMA.

S&T's NUSTL is also executing two-day train-the-trainer sessions in all eight of the DOE Radiological Assistant Program (RAP) regions. Working with BNL and DOE NNSA, the first day of this training allows representatives in each RAP region to receive training on the Guidance, and on the second day they help the S&T's NUSTL project team to train regional representatives from their federal, state and local jurisdictions on the key response missions and tactics they learned about on the previous day. This effort will create a cadre who can support state and local understanding of the science behind the RDD Response Guidance for planning purposes. All sessions are scheduled to be complete by August 2019.

Dan Blumenthal, Consequence Management Program Manager at DOE NNSA said, "I wanted to make sure the RDD Response Guidance is being adopted at the state and local levels, and that all their questions are being answered. One way to do that is making sure RAP teams are up to speed."

Lastly, S&T's NUSTL is partnering with Idaho National Laboratory to develop standardized exercise templates for RDD detonation responses that can be used by the National Guard Bureau 57 WMD-CSTs across the country in their required training and exercises, in conjunction with state and local partners. Providing standardized training and exercise procedures, rooted in sound scientific principles and practices from the Guidance will support local radiological preparedness and encourage interagency coordination for radiological/nuclear response and recovery. These templated exercises will be available to state and local partners in 2020.

Publishing the RDD Response Guidance is a big step forward in ensuring that state and local first responders have a solid scientific basis of the hazard and an easy-to-adopt method of planning for the initial response. But publishing guidance documents is not enough, and S&T's NUSTL and its partners will continue working to ensure the recommendations are further integrated into training courses, exercise design documents and national response protocols. True preparedness for radiological emergencies comes from good coordination and communication between agencies and protocols at the local, state and federal levels, and S&T's NUSTL will continue

to execute research and development projects that, while focusing on supporting first responder radiological capabilities, benefit a comprehensive capability across agencies and levels of government.

Radiological terrorism: Medical treatment principles and challenges

By CDR (MC) PD Dr. med. Alexis Rump MHBA, Cpt (MC) Cornelius Hermann, Maj (MC) Dr. med. Patrick Ostheim, Maj (MC) Dr. med. Julian Haupt, Maj (MC) Dr. med. Leonhard Kaatsch, and Col. (MC) Prof. Dr. med. Matthias Port

Bundeswehr Institute of Radiobiology, Munich, Germany

Source: http://nct-magazine.com/nct-magazine-july-2019/radiological-terrorism-medical-treatment-principles-and-challenges/

Besides nuclear bomb detonations, radiation accidents of different scales may happen in nuclear power or recycling plants as well as in other industrial or research facilities handling radioactivity. An underestimated issue is the loss or theft of radioactive material that may be used for the construction of a "dirty bomb", combining a conventional explosive device with radioactivity. Such a radiological weapon is much easier to construct and to handle than an improvised nuclear device (IND). The radionuclides used for a "dirty bomb" are impossible to predict, but will primarily depend on availability. Cesium-137 is certainly of great concern, as cesium chloride is a powder that will spread easily. Further critical materials include plutonium or americium. The latter is for example included in smoke alarm devices and so easy to get, at least in small amounts. Despite the facility of construction, a "dirty bomb" attack has never occurred till now. However, there are indications that actual preparations for such an attack have happened several times during the last decades. Thus, a "radiological attack" is a real possibility that must be taken seriously by security forces and a sufficient level of preparedness of emergency services seems mandatory.

Three types of injuries

As with every explosive device, victims in the vicinity of the detonation point will suffer blast injuries: This includes primary blast injuries by the contact of the shock wave with the body and stress and shear forces. In particular the blast lung will lead to respiratory failure in the further course. Victims may also be hit by high velocity primary or secondary fragments with resulting penetration injuries (= secondary blast injuries). By the body being propelled onto surfaces or objects, blunt injuries (= tertiary blast injuries) may be expected as well as burns (quaternary blast injuries). Conventional trauma is suited to cause conditions that are immediately life threatening.

In addition to mechanical trauma, injuries resulting from the specific radioactive additive must be expected (= quinary blast injury). External irradiation by ionizing radiation may occur, and depending on the activity included in the "dirty bomb", the dose rate of the radiation and the time of exposure, this may induce an acute radiation sickness. However, many hypothetical scenarios that have been studied seem to indicate that such deterministic radiation effects, although they cannot be excluded in individual cases, are not the major threat in the case of a "dirty bomb" attack. In the planning scenarios developed by the Homeland Security Council (HSC), the large-scale radiological attack (scenario 11) with a total of 540 fatalities and 810 mechanically injured victims does not include a single case of an acute radiation sickness.

The third type of injuries results from the contamination of people with radioactive dust. Although a large fraction of radioactive material will fall down on the ground at a short distance of the point of detonation, there will most probably be a dispersion of radioactivity on a large surface leading to an external contamination of a large number of people. It must be expected that the number of people radioactively contaminated to different extent will by far exceed the mechanically injured victims. External radioactive contamination is principally associated with the danger of radionuclide incorporation through ingestion, inhalation or through wounds, leading to internal contamination of the body. With exceptions (e.g. the Litwinenko case), the radiological doses caused by radionuclide incorporation are insufficient to cause acute radiation sickness. However, the long-lasting irradiation from inside the body is associated with stochastic damages (e.g. mutations) leading to health

impairments in the long run. It was shown that on the average a committed effective dose of 1 mSv will reduce the statistical life expectancy by 0.4 days.

▶▶ Read the rest of this article at source's URL.

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IAEA confirms Iran enriching uranium in excess of 2015 nuclear deal limit

Source: http://www.homelandsecuritynewswire.com/dr20190709-iaea-confirms-iran-enriching-uranium-in-excess-of-2015-nuclear-deal-limit

July 09 – The United Nations atomic watchdog agency has confirmed that Iran has surpassed the limits on how much it was allowed to enrich uranium under the 2015 international nuclear deal.

The International Atomic Energy Agency said its inspectors verified Monday that Iran has passed 4.5 percent enrichment, breaching the 3.67 percent limit set in the accord aimed at restraining Tehran's nuclear weapons development.

The announcement comes hours after Iran's nuclear energy agency said it had passed the limits and would also consider enriching uranium to 20 percent as the next step in its move to back away from its commitments under the nuclear deal.

Iran said it could take such action unless it gets the help it wants from the accord's other signatories to overcome the crippling effect of U.S. economic sanctions imposed by U.S. President Donald Trump after he withdrew from the pact last year.

Uranium enriched to 5 percent is sufficient to produce fuel for nuclear power plants, but still far below the 90 percent needed for building a nuclear weapon.

The European Union, one of the signatories to the deal with Iran, said it was "extremely concerned" about Tehran's action.

"We strongly urge Iran to stop and reverse all activities that are inconsistent with the commitments" it had made under the international agreement, the EU said in Brussels.

Russia said it is concerned about the Iranian action, but Kremlin spokesman Dmitry Peskov said it had warned that Trump's withdrawal from the pact would have negative consequences for global security.
U.S. Vice President Mike Pence said Monday that the United States, under President Trump's leadership, will "never allow Iran to obtain a nuclear weapon." He said the United States will continue to "oppose Iran's malign influence" and said "Iran should not confuse American restraint with a lack of American resolve."
Trump warned Iran on Sunday it "better be careful."
He did not specify to reporters any specific reactions his administration was considering, but reiterated the position that "Iran will never have a nuclear weapon."
Trump made his comment hours after Secretary of State Mike Pompeo tweeted that Iran's decision will lead to "further isolation and sanctions."
"Nations should restore the longstanding standard of no enrichment for Iran's nuclear program. Iran's regime with nuclear weapons would pose an even greater danger to the world," Pompeo wrote.
Iran has threatened further steps away from the deal within 60 days if the remaining signatories do not help it avoid the effects of the U.S. sanctions. The remaining parties, along with Russia and the EU, are Britain, Germany, France and China.
Meanwhile, Iranian Foreign Minister Mohammad Javad Zarif contended that Britain's seizure of an Iranian oil tanker in Gibraltar last week has set "a dangerous precedent and must end now."
Zarif said on Twitter, "Iran is neither a member of the EU nor subject to any European oil embargo. Last I checked, EU was against extraterritoriality. UK's unlawful seizure of a tanker with Iranian oil … is piracy, pure and simple. It sets a dangerous precedent and must end now."
British Royal Marines impounded the tanker on suspicion it was carrying oil to Syria in violation of European Union sanctions, a claim Iran denied.
Iranian President Hassan Rouhani said last week Iran was prepared to enrich "any amount that we want" beyond the 3.67 percent level. He further pledged to resume construction of the Arak heavy water reactor; a project Iran agreed to shut down when it signed the 2015 deal. Iran has also already gone past the 300-kilogram limit for the amount of enriched uranium it is allowed to keep in its stockpile.

Kazakhstan – Once More a Testing Ground?

Source: http://valdaiclub.com/a/highlights/kazakhstan-once-more-a-testing-ground/

Being a staunch supporter of international nuclear disarmament efforts since many years, a very recent and little noticed decision by the Kazakh parliament to approve the Treaty on the Prohibition of Nuclear Weapons could test the seriousness of nuclear disarmament supporters.

July 12 – Kazakhstan's history is closely linked to Moscow's nuclear weapons program. During the Cold War, Soviet leaders ordered excessive nuclear testing in the vast steppes of what later became the modern Kazakh state. Between 1949 and 1989, the Soviet military conducted no less than 456 air and underground nuclear weapons tests at the Semipalatinsk nuclear test site. Radiation exposure led to massive suffering of the local population and caused long-term Kazakh leader Nursultan Nazarbayev to support international nuclear disarmament efforts ever since Kazakhstan declared independence in 1991.
Together with the other four Central Asian states, Kazakhstan was critical in pushing for the establishment of a Central Asian Nuclear Weapons Free Zone, which materialized in 2009. As a result, Central Asian states undertake not to research, develop, manufacture, stockpile, acquire, possess, or have any control over any nuclear weapon or other nuclear explosive device. When 122 countries voted in favor of a new global Treaty on the Prohibition of Nuclear Weapons (TPNW) in 2017 at the United Nations in New York, Kazakhstan was amongst the supporters. Two years on, the Central Asian state is now becoming the 25th country to approve the TPNW, which enters into force once 50 states have deposited their instruments of ratification with the United Nations.

Kazakhstan's decision reflects a growing frustration among UN member states with the nuclear weapons-states not meeting their

disarmament obligations under a much older agreement. In 1968, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) codified what has become known as the 'nuclear haves' and the 'nuclear have nots.' Under the terms of the NPT, five states – China, France, Russia, the United Kingdom, and the United States – are officially allowed to have nuclear weapons while all other states are denied these weapons of mass destruction. To sweeten the massively unfair deal for the 'have nots,' the 'nuclear haves' pledged to assist in the development and use of civil nuclear energy and promised to "pursue negotiations in good faith on effective measures relating to … nuclear disarmament." Quite contrary to that promise, today, all 'nuclear haves' are modernizing their arsenals, effectively extending their operation well into the second half of the 21st century.

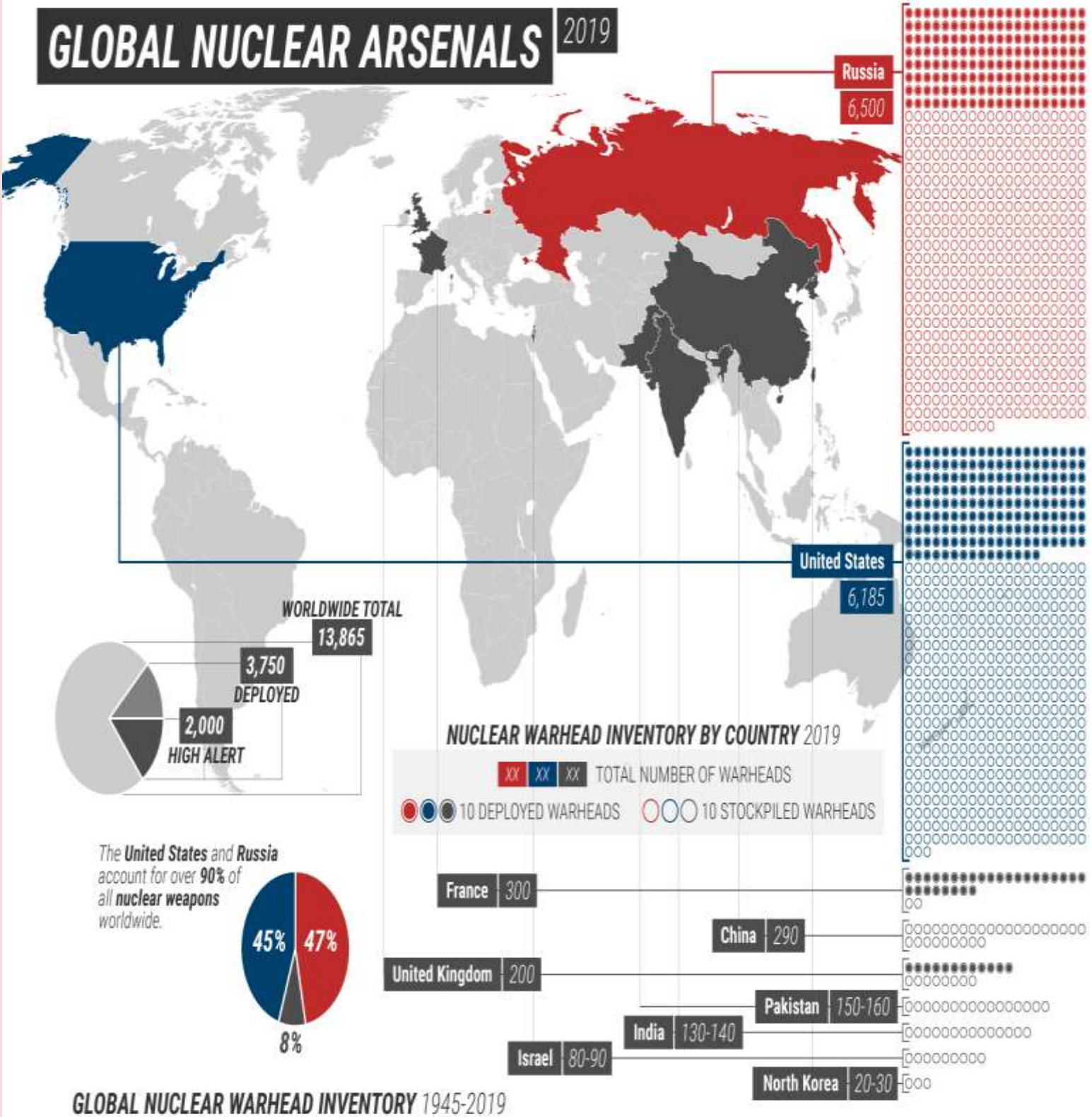
The TPNW, or Ban Treaty, aims to outlaw nuclear arms completely and for the first time. Predictably, nuclear weapons-states are in fierce opposition to the Treaty. Ever since its coming into being, supporters and opponents exchange stark rhetoric about the impact or non-impact of the new accord. Meanwhile, particularly civil society groups in favor of the TPNW such as the Nobel Peace Price-winning International Campaign to Abolish Nuclear Weapons (ICAN), take aim at those NPT states that are officially non-nuclear weapons-states but take part in nuclear activities such as NATO's nuclear sharing mechanisms. For right or wrong, those states – Germany, Belgium, Italy, to name just a few – are being heavily criticized for their direct or indirect support of nuclear weapons policies by NGOs such as ICAN.

What does all that have to do with Kazakhstan? To begin with, Kazakhstan is a member of the Moscow-led Collective Security Treaty Organization (CSTO). Akin to NATO, the CSTO – comprising Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia, and Tajikistan – was built on a collective defense clause. Article 4 of the 1992 Treaty on Collective Security states: "In case an act of aggression is directed against any of the States Parties, all other States Parties shall provide it necessary assistance, including military assistance, and shall also support it by all means available in exercise of the right of collective defense under Article 51 of the Charter of the United Nations." Given that Russia is nuclear-armed, "all means available" could as well mean 'nuclear means.' While the wording of the CSTO defense clause leaves room for interpretation, another Kazakh link to Moscow's nuclear deterrent is more obvious.

After the breakup of the Soviet Union, Kazakhstan signed bilateral treaties with Russia on the lease of missile testing ranges on Kazakh territory. For instance, 25 percent of Russia's Kapustin Yar testing range are located in Kazakhstan. From the Russian part of the Kapustin Yar site Russian missiles are regularly launched to test Russian missile defense installations located at the Sary-Shagan site, a Kazakh testing ground, 480 km in length and located near lake Balkhash. One could argue that missile defense tests, at least those testing interceptors, are not a directly related part of a nuclear weapons program. But in November 2015, Russia's strategic missile force successfully tested an intercontinental ballistic missile RS-12M "Topol" from Kapustin Yar. The purpose of the test was to test a new warhead. According to the Russian Defense Ministry's strategic missile force spokesperson Colonel Igor Yegorov, "The missile's dummy warhead hit a hypothetical target at the Sary-Shagan proving ground, in neighboring Kazakhstan. The accuracy was within the expected parameters."

How are these activities in line with the stipulations of the TPNW? The short answer is they are not. Article 4(2) of the Treaty expressly

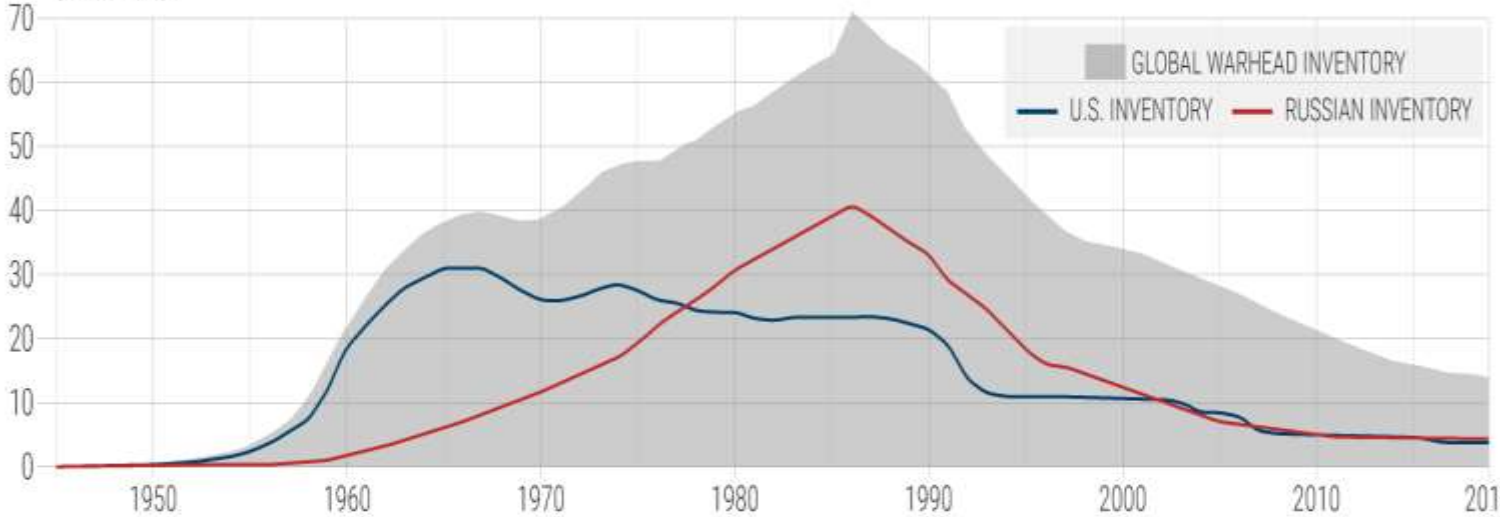
GLOBAL NUCLEAR ARSENALS 2019



The **United States** and **Russia** account for over **90%** of all **nuclear weapons** worldwide.

GLOBAL NUCLEAR WARHEAD INVENTORY 1945-2019

(THOUSANDS)



Source: SIPRI Yearbook 2019, Federation of American Scientists, Arms Control Association, The New York Times

nuclear arms they might possess, "including the elimination or irreversible conversion of all nuclear-weapons-related facilities." A first meeting of States Parties to the Treaty is set to determine a deadline for irreversible elimination/conversion, once the Treaty has entered into force. While this might take some time, Kazakhstan's choices are somewhat limited. If the country is to seriously comply with the TPNW it will have to close its testing ranges to Russian missile testing. Alternatively, it could push to water down the rather unspecific provisions of the TPNW, withdraw from the Treaty altogether or cheat. Neither of these options looks favorable. At least Moscow seems very relaxed. "This does not prevent us from remaining allies and friends," commented an unperturbed Russian government official back in 2017 when Kazakhstan voted in favor of the Ban Treaty.

Taken together, Kazakhstan's continued contribution to and benefitting from Moscow's nuclear deterrent could help to undermine the Ban Treaty while still in its infancy. At least, it puts into question how serious supporters of the Ban Treaty are when it comes to establishing a clear-cut disarmament norm. Once the TPNW enters into force, states parties will have to face the difficult task of defining what nuclear weapons-related activities really means. Anon, civil society groups such as ICAN will have to answer whether they would also openly criticize TPNW signatories or only those remaining outside of the agreement. Clearly, Sary Shagan represents a testing ground for the new Treaty.

New Terrorist Threat:

Using 3D Printers to Make Nuclear Weapons

Source: https://www.newsmax.com/platinum/3d-printers-weapons-proliferation-mass-destruction-nuclear-weapons/2019/07/11/id/924147/

Four Ways 3D Printing May Threaten Security

Source: https://www.rand.org/blog/articles/2018/05/four-ways-3d-printing-may-threaten-security.html

US nuclear weapons give Belgium a seat at 'big boy table,' top military official says

Source: https://www.brusselstimes.com/belgium/60781/us-nuclear-weapons-give-belgium-a-seat-at-big-boy-table-top-military-official-says/

July 16 – Reports that Belgium stores United States nuclear weapons have sparked debate among politicians and top government officials over the country's "worst-kept secret," with an unnamed defence official arguing that keeping the warheads meant the country had a seat at the "big boy table."

Years of neither confirm nor deny policy observed by federal and military authorities went up in smoke after a draft document published on the NATO Parliamentary Assembly website confirmed that U.S. nuclear warheads were stored in a Belgian airbase.

Seizing on the report, Flemish green party, Groen, called on federal authorities to allow a debate to be held on the matter, with one party representative questioning whether our country should continue storing the weapons for the U.S.-powered military alliance.

"Do we really want weapons of mass destruction in our territory with someone like Donald Trump at the buttons?" Groen's Wouter De Vriendt said on broadcast radio.

The green party's stance was echoed by its socialist counterpart, the sp.a, with two members of the party taking to Twitter to reiterate demands for nuclear weapons to be removed from Belgium.

However, an anonymous military source said Belgium's stance on the international stage benefited from the arrangement.

"Nuclear weapons in our country do not cost our country anything — and we sit at the table with the big boys," an unnamed military official said, according to De Morgen, swinging back at budgetary arguments advanced by a sp.a member.
The official further argued that removing the warheads from our country would prove costlier than keeping them in, saying Belgium would have to pour additional funds into the defence budget if the government decides to heed calls for nuclear decommissioning.
Both the spa and Groen said they will raise the issue during a defence parliamentary committee slated for Wednesday.
As the news of the revelations picked up steam on Belgian media, a spokesperson for the defence ministry said "we cannot and should not speak about it," suggesting that the party's demands may fall on deaf ears.

Radiation in Parts of the Marshall Islands Is Far Higher than Chernobyl, Study Says

Source: http://www.homelandsecuritynewswire.com/dr20190717-radiation-in-parts-of-the-marshall-islands-is-far-higher-than-chernobyl-study-says

July 17 – Think of the most radioactive landscapes on the planet and the names Chernobyl and Fukushima may come to mind. Yet research published Monday suggests that parts of the Marshall Islands in the central Pacific, where the United States conducted 67 nuclear tests during the Cold War, should be added to the list. Susanne Rust writes in the *Los Angeles Times* that In a peer-reviewed study, Columbia University researchers report that soil on four isles of the Marshall Islands contains concentrations of nuclear isotopes that greatly exceed those found near the Chernobyl and Fukushima nuclear power plants. On one isle, those levels are reported to be 1,000 times higher. All four of the islands are currently uninhabited, and three of the four — Bikini, Enjebi and Runit — are in atolls where nuclear testing took place. But one of the islands, Naen, which measures less than an acre, is in Rongelap Atoll, nearly 100 miles away.

Bill Expands Compensation for Victims of Radiation Exposure

Source: http://www.homelandsecuritynewswire.com/dr20190717-bill-expands-compensation-for-victims-of-radiation-exposure

July 17 – Congressman Ben Ray Luján (D-New Mexico) the other day introduced legislation to expand compensation for individuals exposed to radiation while working in and living near uranium mines or downwind from nuclear weapon test sites.
Tens of thousands of individuals, including miners, transporters, and other employees who worked directly in uranium mines, along with communities located near test sites for nuclear weapons, were exposed during the mid-1900s to dangerous radiation that has left communities struggling from cancer, birth defects, and other illnesses.

The Radiation Exposure Compensation Act Amendments of 2019 (RECA) provides health and monetary compensations for individuals who were exposed to high levels of radiation that caused sickness, cancer, and deaths in New Mexico and across the country. RECA was first passed in 1990 to ensure the federal government met its responsibilities to Americans who made sacrifices for our national security. The legislation has more than thirty-five co-sponsors.

Without this legislation, the current authorization for RECA will expire in two years – leaving thousands without the ability to pay for their medical care for illnesses directly linked to the exposure.

Native and tribal communities were disproportionally exposed to the dangerous radiation in New Mexico and in other communities throughout the U.S. This legislation will seek to rectify this significant disparity and help bring justice to all the communities exposed.

Specifically, the RECA legislation:

- ***Congressional apology:*** Includes a congressional apology to the individuals in New Mexico, Idaho, Colorado, Arizona, Utah, Texas, Wyoming, Oregon, Washington, South Dakota, North Dakota, Nevada, Guam, and the Northern Mariana Islands who were exposed to radiation.
- ***Extension of fund:*** Amends the original *Radiation Exposure Compensation Act* to extend the Radiation Exposure Compensation Trust Fund until 2045. The original act sunsets in 2022.
- ***Claims relating to uranium mining:*** Extends to December 31, 1990, the period during which an individual employed in a uranium mine or a uranium mill is eligible to receive compensation for a disease claim due to radiation exposure.
- ***Claims relating to atmospheric testing:*** **Expands** the definition of affected Downwind states to include Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Guam; which have been shown to be impacted by downwind contamination.
- ***Residency requirements*****:** Expands the proof of residency requirements to be consistent with Native American law, custom, and tradition.

"Throughout my time in Congress, I've fought to ensure justice for communities impacted by radiation exposure – including miners, workers, and downwinders. Radiation exposure has taken the lives of too many and continues to hurt our communities. I know how important this legislation is for New Mexico families that have been affected. This legislation will extend compensation for those individuals who played a role in our national security and help make those individuals whole," said Luján. "Radiation exposure disproportionally impacted Tribal communities and Native Americans in New Mexico – a health, justice, and fairness disparity that has lingering impacts to this day. The Radiation Exposure Compensation Act Amendments of 2019 will help right past wrongs and I'm proud to champion this effort in the Congress."

Helping first responders deal with dirty bombs

Source: http://www.homelandsecuritynewswire.com/dr20190717-helping-first-responders-deal-with-dirty-bombs

July 17 – If a radiological dispersal device (RDD), or "dirty bomb," ever explodes in the United States, emergency crews may be better prepared because of a simulator developed by an Lawrence Livermore National Laboratory (LLNL) visualization technologist.

Called the **RDD Studio**, the model was developed by the Lab's Ryan Chen to provide a detailed simulation of what an optimal response to an RDD would look like.

LLNL notes that the simulator grew out of an effort to give "life" to a 2017 Department of Homeland Security Science and Technology Directorate (DHS S&T) report, "RDD Response Guidance: Planning for the First 100 Minutes," and has helped produce 14 videos that illustrate the hazards, tactics and procedures for an RDD response.

The simulator developed by Chen, a data analyst and visualization technologist in the Computing Directorate's Global Security Computing Applications Division, has been drawing high praise since it was released in April.

The guidance report and the model can be found on the DHS website. All 14 videos are available on the DHS S&T YouTube channel.

Ryan Chen, an LLNL data analyst and visualization technologist, has developed a model called the RDD Studio that provides a detailed simulation of what an optimal response to a radiological dispersal device, or "dirty bomb," would look like. Photo by Julie Russell/LLNL

"This 20-minute video by LLNL and the National Urban Security Technology Laboratory (NUSTL) is the best description of the management of a 'dirty bomb' or RDD incident out there," said John White, the radiation safety officer for the Veterans Administration North Texas Health Care System.

"Your law enforcement and fire/hazards personnel must view this video. It should become a regular part of your training for any radiological event. The RDD Studio can assist emergency crews in learning how to manage the risk in responding to an RDD."

Mark Hundley, a master firefighter with the City of Virginia Beach, Virginia, and a leader for the Virginia-2 Urban Search and Rescue team, calls the response to the video among firefighters "incredible."

"The visual depiction gives the basic frontline firefighter a better understanding of a radioactive incident that is very hard for most to understand from a simple power point slide. This video does an amazing job. I can't express the value of this video for us," Hundley explained.

Ben Stevenson, the NUSTL's R&D division leader, lauded the RDD simulator. "Ryan's work in support of our mission, helping responders visualize radiation response and safety concepts, has been invaluable in effectively communicating technical best practices and continues to positively impact radiological preparedness at all levels of government."

Brooke Buddemeier, a principal investigator for Global Security's N Program radiological and nuclear response efforts, pointed out that the purpose of the simulator is to demonstrate to emergency responders how they can do their jobs and save lives without putting themselves in danger.

An RDD consists of conventional explosives combined with radioactive material with the intent of spreading the radioactive contamination around the scene of the explosion and possibly downwind.

RDD Studio is designed to simulate the dispersal of ballistic source fragments of various sizes and to visualize the resulting downwind ground contamination. The tool uses empirical data collected from real-world explosive tests and a computational fluid dynamic atmospheric dispersion model to define the post-blast radiologically contaminated urban environment.

After the RDD is simulated and the radiological hazards are established, RDD Studio deploys virtual responders to demonstrate the tactics provided in the DHS response guidance.

"This interactive agent-based model's ability to track and record virtual responder's performance statistics and exposure data makes it an effective tool for response training and procedure development," Buddemeier said.

The use of a customizable software simulator provides the capability to evaluate response tactics and outcomes in a variety of circumstances. Users can test procedures against various source types, activity level, number of fragments, fragment sizes, number of casualties, number of civilians nearby, number of response assets deployed and responder arrival frequency.

Since the animations produced by the RDD Studio have gone online, they have been viewed by more than 2,600 people, with many of them thought to be emergency responders.

"These videos have been very well received by the emergency response community as they visualize complex radiological response issues in a way that makes it easier to understand," Buddemeier said.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EXPLOSIVE NEWS

Researchers Develop Compact Explosives Detector

Source: https://i-hls.com/archives/92622

June 30 – Researchers at the Indian Institute of Technology have managed to develop a portable and compact sensor that can detect explosive material such as DNT and TNT. The sensor can **detect explosive residues in real time** and will be used in public areas to prevent acts of terrorism.

Chemicals such as TNT, DNT, and TNP can be a serious threat to civilians and military personnel. Aside from being explosive, they are also considered to be toxic.

The new device can lay the framework for a compact and lightweight explosive sensor that can prove to be extremely useful for military and security screening.

Business-Standard.com mentions that the team that has worked on developing the sensor have developed the device by using a technique based on fluorescence spectroscopy, which is a method of analyzing the light emitted from samples.

The device changes colors when explosives make contact with the synthesised polymer that the researchers have developed.

This certain polymer can detect nitroaromatics, the explosive class of compounds.

When the polymer comes into contact with TNT, DNT, or TNP vapor the polymer can alert the user of the explosives, making the sensor great for field applications.

The sensor gives real time information making it incredibly useful for defense applications and for forensic investigations. The sensor immediately changes color only when in the presence of TNT, DNT, and TNP. The color change is noticeable to the naked human eye.

The sensor is very small and can be easily implemented into airports, bus stations, government buildings and more. The device will come at a much lower price than traditional bomb detecting devices. The team is currently working on developing a similar device that can detect other types of explosives, such as nitroglycerin.

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CYBER NEWS

A Florida city paid a $600,000 bitcoin ransom to hackers who took over its computers — and it's a massive alarm bell for the rest of the US

Source: http://www.homelandsecuritynewswire.com/dr20190621-a-florida-city-paid-a-600-000-bitcoin-ransom-to-hackers-who-took-over-its-computers-and-its-a-massive-alarm-bell-for-

June 21 – A Florida city agreed to pay $600,000 worth of bitcoin to hackers who took its computer systems offline with a cyberattack. Riviera Beach's city council voted to pay the money after an attack in May affected the city's online services, including email and 911 dispatches. The attack is part of a pattern that has targeted cities around the US. The disruption has cost millions of dollars. Sinéad Baker write in *Business Insider* that the U.S. Department of Homeland Security warned in 2018 that local-level governments around the U.S. were being hit with malware that is "among the most costly and destructive."

Second Florida city pays ransom to hackers

Source: http://www.homelandsecuritynewswire.com/dr20190628-second-florida-city-pays-ransom-to-hackers

June 28 – A second small city in Florida has agreed to pay hundreds of thousands of dollars in ransom to cybercriminals who disabled its computer system.

Days after ransomware crippled the city of about 12,000 residents, officials of Lake City agreed this week to meet the hackers' ransom demand: 42 Bitcoin or about $460,000.

Last week, River Bench, in Palm Beach County, paid $600,000 in Bitcoin to retrieve its data. In both cases, most of the money will be paid by insurance companies.

On Thursday, Key Biscayne, a third Florida city, said it too had been targeted by a cyberattack. But city officials said it had managed to restore most of its computer systems by late Wednesday.

Ransomware, a type of malicious software designed to deny access to a computer system or data until a ransom is paid, is becoming an epidemic in the public sector.

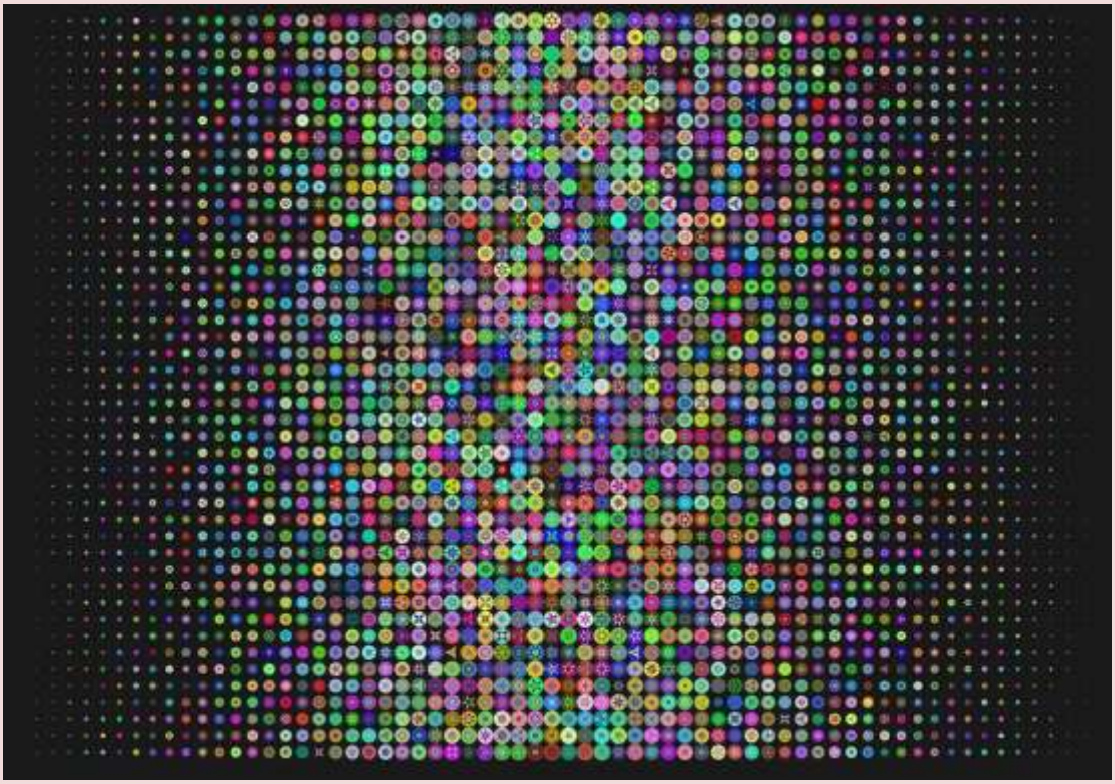
The cybersecurity firm Recorded Future reported in May that 170 city, county or state government systems have been attacked since 2013.

Ransomware attacks are not limited to small cities. Baltimore, a city of more than 600,000, has been fighting a cyber breach since May. The city refused to pay the $80,000 ransom that the hackers demanded. Instead, it has spent $18 million on data recovery.
Similarly, the city of Atlanta spent nearly $17 million after it was targeted in March 2018.
In November, the FBI indicted two Iranian men in a computer hacking and extortion scheme that targeted cities like Atlanta and Newark, N.J., in addition to the Port of San Diego, the Colorado Department of Transportation and six health care-related organizations. The estimated losses added up to more than $30 million.

WannaCry attack
One of the largest ransomware attacks was WannaCry, which encrypted hundreds of thousands of computers in more than 150 countries in a matter of hours. It was the first time that ransomware had spread across the world in what looked like a coordinated cyberattack.
The British national health care system was especially hard hit by WannaCry, which caused thousands of hospitals to go offline. The attack also affected government systems, railway networks and private companies.
It was eventually traced to a group of hackers working for North Korea who used stolen highly classified hacking tools developed by the U.S. National Security Agency.

Researchers develop 'vaccine' against attacks on machine learning

Source: https://phys.org/news/2019-06-vaccine-machine.html



June 20 – Researchers from CSIRO's Data61, the data and digital specialist arm of Australia's national science agency, have **developed a world-first set of techniques to effectively 'vaccinate' algorithms against adversarial attacks, a significant advancement in machine learning research.**
Algorithms 'learn' from the data they are trained on to create a machine learning model that can perform a given task effectively without needing specific instructions, such as making predictions or accurately classifying images and emails. These techniques are already used

widely, for example to identify spam emails, diagnose diseases from X-rays, predict crop yields and will soon drive our cars.
While the technology holds enormous potential to positively transform our world, artificial intelligence and machine learning are vulnerable to adversarial attacks, a technique employed to fool machine learning models through the input of malicious data causing them to malfunction.
Dr. Richard Nock, machine learning group leader at CSIRO's Data61 said that by adding a layer of noise (i.e. an adversary) over an image, attackers can deceive machine learning models into misclassifying the image.
"Adversarial attacks have proven capable of tricking a machine learning model into incorrectly labelling a traffic stop sign as speed sign, which could have disastrous effects in the real world.
"Our new techniques prevent adversarial attacks using a process similar to vaccination," Dr. Nock said.
"We implement a weak version of an adversary, such as small modifications or distortion to a collection of images, to create a more 'difficult' training data set. When the algorithm is trained on data exposed to a small dose of distortion, the resulting model is more robust and immune to adversarial attacks,"
In a research paper accepted at the 2019 International Conference on Machine Learning (ICML), the researchers also demonstrate that the 'vaccination' techniques are built from the worst possible adversarial examples, and can therefore withstand very strong attacks.
Adrian Turner, CEO at CSIRO's Data61 said this research is a significant contribution to the growing field of adversarial machine learning.
"Artificial intelligence and machine learning can help solve some of the world's greatest social, economic and environmental challenges, but that can't happen without focused research into these technologies.
"The new techniques against adversarial attacks developed at Data61 will spark a new line of machine learning research and ensure the positive use of transformative AI technologies," Mr Turner said.
The research paper, "Monge blunts Bayes: Hardness Results for Adversarial Training," was presented at ICML on 13 June in Los Angeles.

Hacking Group Adds Electric Utilities to Its Energy Sector Targets

Source: https://www.hstoday.us/subject-matter-areas/cybersecurity/hacking-group-adds-electric-utilities-to-its-energy-sector-targets/

June 15 – The most dangerous threat to ICS has new targets in its sights. Dragos identified the XENOTIME activity group expanded its targeting beyond oil and gas to the electric utility sector. This expansion to a new vertical illustrates a trend that will likely continue for other ICS-targeting adversaries.
Industrial control system (ICS) cyber threats are proliferating. More capable adversaries are investing heavily in the ability to disrupt critical infrastructure like oil and gas, electric power, water, and more. Attacking any industrial sector requires significant resources, which increases as capabilities and targeting expand. The high resource requirement previously limited such attacks to a few potential adversaries, but as more players see value and interest in targeting critical infrastructure – and those already invested see dividends from their behaviors – the threat landscape grows.
To illustrate and highlight this major strategic risk to industrial environments worldwide and across every industry, Dragos is publishing new intelligence on XENOTIME. In anticipation of this release, Dragos worked with global electric utilities to increase their defense against this and the other threats to industrial control systems. Dragos Platform customers have detections for XENOTIME, as the product receives these and other threat behavior detection updates regularly.

Deepfake detection algorithms will never be enough

Source: http://www.homelandsecuritynewswire.com/dr20190628-deepfake-detection-algorithms-will-never-be-enough

June 28 – You may have seen news stories last week about researchers developing tools that can detect deepfakes with greater than 90 percent accuracy. It's comforting to think that

with research like this, the harm caused by AI-generated fakes will be limited. Simply run your content through a deepfake detector and bang, the misinformation is gone! James Vincent writers in *The Verge* that software that can spot AI-manipulated videos, however, will only ever provide a partial fix to this problem, say experts. As with computer viruses or biological weapons, the threat from deepfakes is now a permanent feature on the landscape. And although it's arguable whether or not deepfakes are a huge danger from a political perspective, they're certainly damaging the lives of women here and now through the spread of fake nudes and pornography.

Security and the "Holographic Society"

Source: http://www.homelandsecuritynewswire.com/dr20190712-security-and-the-holographic-society

July 12 – Cyberattack is slowly becoming the preeminent form of international engagement, so much so that it's simply been assumed that current U.S. retaliation against Iran includes cyberattacks. That just makes it part of an ongoing, "larger pattern of cyber exchanges" between the two adversaries, as Brandon Valeriano and Benjamin Jensen phrased it recently in the *Washington Post* — and of the growing presence of cyber operations in global conflict. Eric B. Schnurer writes for Stratfor that the cyber world is dissolving distinctions between war and non-war, between what's "inside" a country and what's outside it, between the state and society. In fact, the very distinction between the virtual and physical worlds is itself dissolving. So perhaps we ought to be thinking about security in the physical world as we do in cyber. "In the siege mentality sweeping much of the world, including President Donald Trump's "American carnage" worldview, safety lies only within territorially defined, demographically homogeneous nations with autochthonous economies and not just firm, but also largely impenetrable, borders that keep all threats at bay. This outlook may have it backward, however, putting America and its interests at greater risk.

Physical security as well as cybersecurity in the 21st century increasingly lie not in becoming a fortress nation, but in doubling down on being a holographic one: promoting greater global integration, sending our people and products abroad more aggressively, and welcoming a more diverse array of the rest of the world's peoples and products within our national borders," Schnurer writes.

How Cyber Weapons Are Changing the Landscape of Modern Warfare

Source: http://www.homelandsecuritynewswire.com/dr20190718-how-cyber-weapons-are-changing-the-landscape-of-modern-warfare

July 18 – In the weeks before two Japanese and Norwegian oil tankers were attacked, on 13 June, in the Gulf of Oman—acts which the United States attributes to Iran—American military strategists were planning a cyberattack on critical parts of that country's digital infrastructure. According to an officer involved, who asked to remain anonymous, as Iran ramped up its attacks on ships carrying oil through the Persian Gulf—four tankers had been mined in May—and the rhetoric of the national-security adviser, John Bolton, became increasingly bellicose, there was a request from the Joint Chiefs of Staff to "spin up cyber teams." On June 20th, hours after a Global Hawk surveillance drone, costing more than a hundred

million dollars, was destroyed over the Strait of Hormuz by an Iranian surface-to-air missile, the United States launched a cyberattack aimed at disabling Iran's maritime operations. Then, in a notable departure from previous Administrations' policies, U.S. government officials, through leaks that appear to have been strategic, alerted the world, in broad terms, to what the Americans had done.

Sue Halpern writes in the *New Yorker* that during much of the Obama Administration, the United States's cyber arsenal was strictly classified. As Michael Hayden, a former director of the N.S.A. and the C.I.A., told the filmmaker Alex Gibney in the documentary "Zero Days," from 2016, "For the longest time, I was in fear that I actually couldn't say the phrase 'computer network attack.' " This past September, the Department of Defense issued a strategic plan that not only confirmed the existence of cyber weapons but declared its commitment to using them "to advance U.S. interests" and "defend forward." The cyberattack on Iran in June was a manifestation of this new, more aggressive approach. (A spokesperson from Cyber Command, the military unit that oversees U.S. digital warfare, said, "As a matter of policy and for operational security, we do not discuss cyberspace operations, planning, or intelligence.")

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DRONE NEWS

Advanced Counter-Drone Systems to Prevent Further Airport Attacks

Source: https://i-hls.com/archives/92270

June 21 – In the past, airports have been susceptible to various types of attacks. However, with increased security measures and advances in technology, the rate at which airports and infrastructure encounter attacks has decreased a considerable amount. It is imperative that airports maintain the public's safety for the sake of many people's lives.

Improvements in technology around the world coincidentally create an expansion of methods of attack at airports and civilian infrastructure. One relatively new approach for aggressors is utilizing drones in the vicinity of airports. A recent drone incident at London Gatwick Airport in December 2018 affected about 1,000 flights. It leads to the airport temporary closing and later – to the development of the **AirGuard and AirShield counter-drone systems**; these systems are based on the Counter-Unmanned Aerial System (C-UAS) AUDS.

"AirGuard is intended to protect the airport perimeter and AirShield will monitor the flightpath, with both systems configured to the requirements and security level of each installation," according to airport-technology.com. These two systems offer protection up to 10km away from the runway, although it is illegal to fly a drone within just 1km of an airport boundary.

With both systems up and running, airports will be completely observant to the potential existence of UAVs. The AirGuard system itself automatically exposes the presence of airborne objects with numerous sensors, warning the operator. It also allows the operators to provide necessary security agencies with accurate information, including recorded video evidence for future prosecution purposes, whilst minimizing potential disruption from false alarms, as stated in unmannedairspace.info. AirGuard can either be a fixed installation or directly attached to a vehicle.

AirShield on the other hand, provides protection against UAV by initially detecting it and then alerting the threat to air traffic control (ATC) where a solution is implemented. In order to track and classify the vehicles in a smooth and proper fashion, the system uses multi-spectrum electro-optical video capability. This will indicate the location, velocity, and data of the UAV to the ATC until it is no longer perceived as a threat to an aircraft.

The company that is behind the development of the AirGuard and Airshield counter-drone systems is Chess Dynamics (British integrated systems and technologies company).

Medical Drones for Accident and Emergency

Source: http://www.homelandsecuritynewswire.com/dr20190712-medical-drones-for-accident-and-emergency

July 12 – Remote or computer-controlled aircraft, commonly referred to as drones could revolutionize the way in which emergency medical supplies, such as bags of blood plasma, are delivered to areas hit by disaster, accidents or other life-threatening situations. Of course, drones are costly and require skilled operators. Writing in the International *Journal of Business Continuity and Risk Management*, a team from the U.S. has undertaken a cost analysis of using drones for this purpose.

Inderscience says that the team hoped to show that the delivery of emergency supplies using drones is economically viable in the context of road-traffic accidents. By looking at a range of scenarios where drones might be used the team's cost analysis supports their hopes, especially as the timely use of drones rather than ground vehicles could ultimately be a matter of life and death. Their particular focus could readily be generalized to other emergency situations given adequate additional data and the construction of appropriate scenarios for other types of emergency.

The team's analysis focused on two locations in Florida, one near Tampa, the other near Orlando. Both areas have at least one fatality every week due to a road traffic accident and so an improvement in the medical response in those areas could have a significant impact on total lives lost each year in the state. Of course, a road traffic accident will inevitably increase the level of congestion on already congested road networks and make it more difficult for paramedics and ambulances to reach the accident quickly. The use of drones could allow equipment and supplies to get to a site where paramedics may well have arrived on a motorbike, for instance.

Assessing the Danger of Drone Strike

Source: http://www.homelandsecuritynewswire.com/dr20190711-assessing-the-danger-of-drone-strike

July 11 – The rapid rise in the number of drones worldwide has been accompanied by increasing reports of near misses with commercial aircraft. In 2017, while coming in to land, a Canadian passenger aircraft actually collided with a drone, narrowly escaping catastrophe. Bird-strike tests for aircraft are mandatory. To date, however, there is no equivalent standard test procedure for collisions with drones. In order to be able to fundamentally understand the consequences of a collision between an aircraft and a drone, the Fraunhofer Institute for High-Speed Dynamics, Ernst-

Mach-Institut, EMI is now planning to build a test bench for recreating various collision scenarios with complete drones.

Fraunhofer notes that the incidence of drones impacting air traffic has risen in recent years. In 2018, there were 158 cases reported at German airports. Indeed, Germany's federal police has warned of a massive threat posed by unmanned aerial vehicles. This year, at the beginning of May, flight operations at Frankfurt Airport had to be shut down completely for a short period following the sighting of a drone. The total number of drones in private and commercial use in Germany is forecast to rise to 847,000 by 2030, an increase of almost 80 percent. Drones endanger not only aircraft coming into land but also low-flying helicopters. Pilots live in fear of a drone hitting the cockpit windshield, the engine or the leading edge of the wings. Experts are of the opinion that a collision with a drone would cause more damage to the aircraft than the impact of a bird strike. Before being certified for use, aircraft must undergo a standard test to assess their tolerance to bird strike. In the case of drones, however, there are no such regulations. Researchers from Fraunhofer EMI in Freiburg are keen to see changes here. "From a mechanical point of view, drones behave differently to birds and also weigh considerably more," explains Dr. Sebastian Schopferer, one of the scientists working on this project. "It is therefore uncertain, whether an aircraft that has been successfully tested against bird strike, would also survive a collision with a drone."

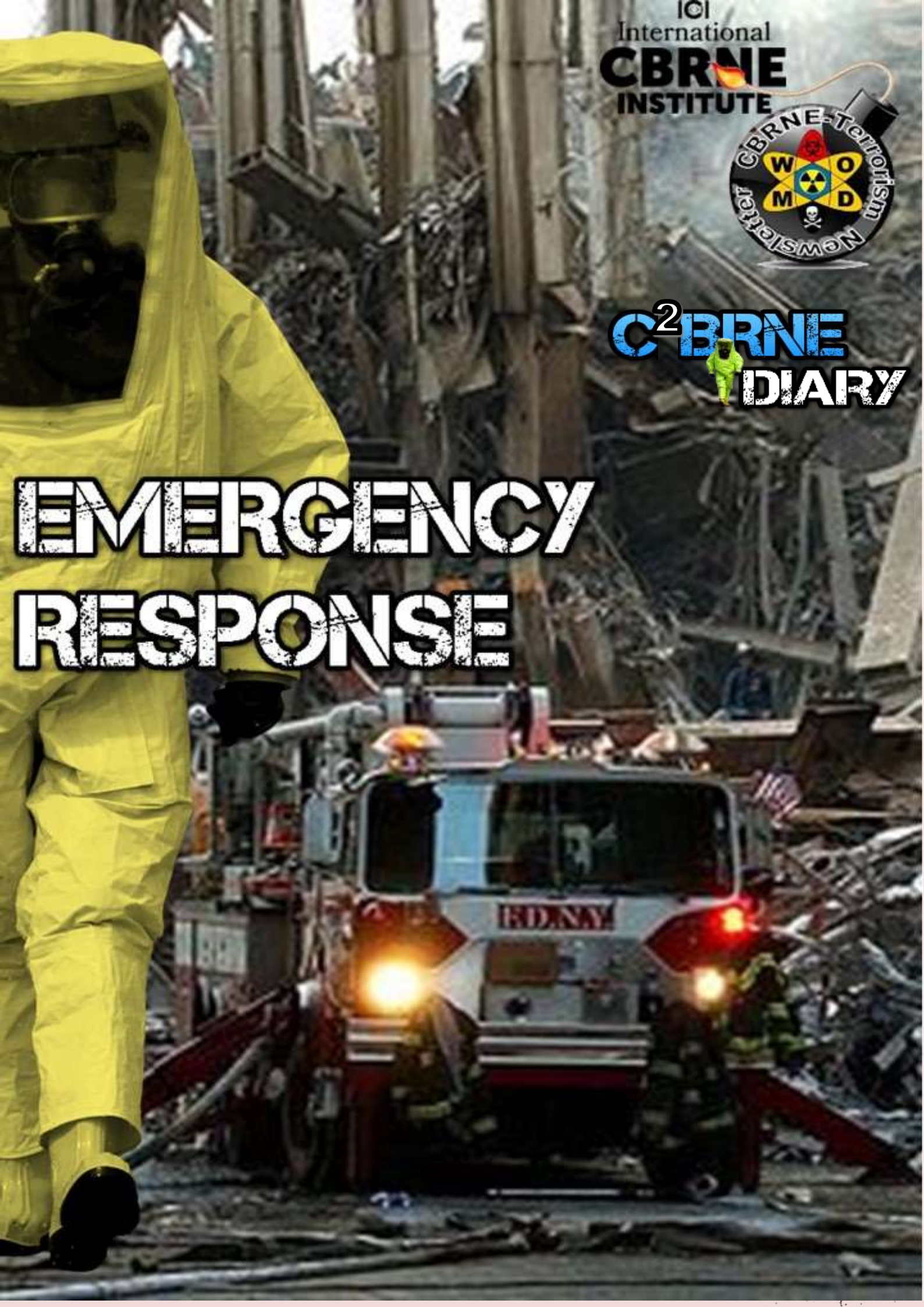
A Major Threat to Safety

Initial impact tests with drone batteries and motors have confirmed the danger. "Using compressed air, we accelerated these two components to speeds ranging from 115 to 255 meters per second and fired them at aluminum plates up to eight millimeters in thickness that were mounted in a test bench," Schopferer explains. Given their weight, both the battery and the motor can cause major damage: "There was substantial deformation and indentation of the plates, and the drone battery and engine were completely destroyed." The outcome of the tests was recorded with a high-speed video camera.

The primary objective of this series of tests is to determine the transfer of momentum at the instant of impact with the two aforementioned components and to investigate the associated damage to aircraft materials such as aluminum alloys and fiber composites. In parallel to these dynamic investigations, researchers also conducted a number of quasi-static pressure tests in order to determine the strength and rigidity of the drone components. These results will play an essential role in the derivation of numerically efficient, predictive simulation models that the aviation industry can then use to ascertain new and important findings about the impact behavior of drones. Using such models during the design phase, it will be possible to assess the resistance of new aircraft components to the impact of a drone.

Acceleration Tests with Complete Drones

In order to simulate realistic impact scenarios, researchers are now planning to construct a new type of test bench for investigating the impact of complete drones with a maximum weight of three kilograms and flying at speeds of up to 150 meters per second. "We will be able to investigate the impact and fragmentation of complete drones during collision with both rigid and flexible targets and thereby study the presumably catastrophic effects of a drone strike for an aircraft," Schopferer explains. "Tests in this weight class of drone have never been carried out before." The tests will be conducted with a variety of drones, including both amateur and semiprofessional models, weighing between one and three kilograms. In addition to aircraft manufacturers, these investigations will also benefit aviation authorities, providing them with important information for a more in-depth assessment of the danger to aircraft posed by drones.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Experiment to Improve First Responder Communications

Source: https://i-hls.com/archives/92489

June 25 – Major disasters do not occur frequently, but when they do many people's lives are lost and put into danger. It is imperative that first-responders arrive to help as soon as possible. The University of Alabama in Huntsville (UAH) has been chosen to be a contractor in an experiment devised to make first responder communications and on-site information better during a major disaster.

The experiment comes from the U.S. Dept. of Homeland Security Science and Technology Directorate who assesses upcoming communications technologies in disaster situations.

The Federal Emergency Management Agency has hosted a five-year series of Shaken Fury experiments. The last one "will evaluate selected DHS-developed and commercial technologies to see how they integrate with existing public safety systems using open standards, and how those integrated capabilities enhance operational communications, increase operational coordination, improve responder safety and augment situational awareness," as stated by uah.edu.

The experiment will consist of Shaken Fury provoking the after-effects of an earthquake with a 7.2-7.3 magnitude.

The main point of the experiment is to improve public safety capabilities before Birmingham hosts the World Games in July 2021. The experiment will hopefully lead to communication systems progressing in the near future by congregating industries and first responders.

The experiment will be very realistic, yet hypothetical at the same time. It will encompass Legion Field stadium partially collapsing and releasing hazardous material. In order to keep the public safe in this hypothetical situation, the stadium would need to be evacuated, decontaminated, and search and rescue would be needed.

The experiment will focus on Unmanned Aircraft Systems (UAS) being brought in to initially respond to the disaster. It will then direct its attention to recovery operations. UAS are primarily used in disaster response because they are feasible for the job and have a very long-range. In certain scenarios it is almost impossible for people to perform in certain environments due to safety issues, but UAS have the power to operate in practically any environment.

UAH will be mainly working on technological development, integration testing, and operational deployment. The University will be trialing a variety of surfacing technologies all throughout the experiment to determine which is the most appropriate.

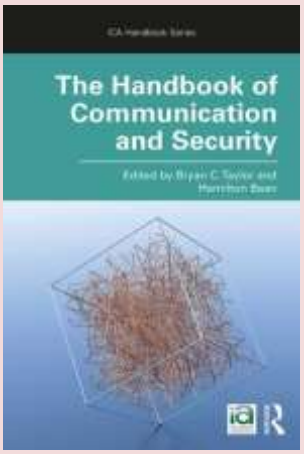
First-respond systems are generally lacking tools for resource tracking, image and video analysis, and common operating pictures for situational awareness platforms. The UAH plans to improve all this with the experiment they are conducting.

The Handbook of Communication and Security

1st Edition

Edited by Bryan C. Taylor, Hamilton Bean

Source: https://www.routledge.com/The-Handbook-of-Communication-and-Security-1st-Edition/Taylor-Bean/p/book/9780367226688



The Handbook of Communication and Security provides a comprehensive collection and synthesis of communication scholarship that engages security at multiple levels, including theoretical vs. practical, international vs. domestic, and public vs. private. The handbook includes chapters that leverage communication-based concepts and theories to illuminate and influence contemporary security conditions.

Collectively, these chapters foreground and analyze the role of communication in shaping the economic, technological, and cultural contexts of security in the 21st century.

This book is ideal for advanced undergraduate and postgraduate students and scholars in the numerous subfields of communication and security studies.

AI helps protect emergency personnel in hazardous environments

Source: http://www.homelandsecuritynewswire.com/dr20190626-ai-helps-protect-emergency-personnel-in-hazardous-environments

June 26 – Whether it's at rescue and firefighting operations or deep-sea inspections, mobile robots finding their way around unknown situations with the help of artificial intelligence (AI) can effectively support people in carrying out activities in hazardous environments. The potential as well as the concrete benefits of AI in this field are illustrated in a current report from Plattform Lernende Systeme, Germany's Platform for Artificial Intelligence, using two application scenarios. The report was presented today at Karlsruhe Institute of Technology (KIT) where scientists are involved in the platform. The authors also identify technical and social challenges, as well as conditions that need to be created for the reliable and economic use of AI in life-hostile environments.

KIT says that in the future, mobile self-learning robots can relieve people from dangerous or harmful activities. At the same time they can make operations in difficult-to-access terrain more economic or possible in the first place. For using such self-learning systems in life-hostile environments some challenges still need to be overcome from a technical point of view, however. These include autonomous learning in unknown environments. In addition, it's about making these autonomous robots collaborate with people.

"The use of artificial intelligence comes with enormous opportunities for our society. Especially in disaster prevention, the decommissioning of nuclear power plants and in the maritime field there are a number of options for effectively supporting professionals with the help of artificial intelligence. This is why Plattform Lernende Systeme has set up an interdisciplinary work group to discuss how self-learning systems can be developed and

used in life-hostile environments for the benefit of people," says Professor Holger Hanselka, President of Karlsruhe Institute of Technology and a member of the Steering Committee of Plattform Lernende Systeme. "IT security will be extremely important particularly in the autonomous systems that we use in the event of a crisis. As a result, in its research KIT is looking at not only protecting the periphery of a complex IT system but also each individual part, particularly adding its expertise in IT security to Plattform Lernende Systeme."

The Life-Hostile Environments work group is using two application scenarios in its report to show how artificial intelligence can offer support in disaster prevention as well as exploration and maintenance missions in around five years. The "Rapid assistance in rescue operations" application scenario illustrates how AI-based robotic systems can support the fire department on the ground and from the air in putting out a fire in a chemical plant. With the help of multiple sensors, the systems are able to quickly create a detailed overview of the situation, set up a communication and logistics infrastructure for rescue operations, search for injured persons and identify and reduce sources of danger. In the "Moving autonomously under water" application scenario, robotic underwater systems maintain the foundations of offshore wind power plants. They navigate independently in the deep sea, take over planning steps, and request support from divers or remote-controlled systems if needed.

Niche market with special requirements

"The demands on self-learning systems are particularly high in life-hostile environments: they have to be intelligent and robust against extreme conditions and be able to independently deal with unforeseen circumstances," says Jürgen Beyerer, Head of the Life-Hostile Environments work group of Plattform Lernende Systeme, Director of the Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB and Professor for Interactive Real-Time Systems at KIT. "Until then, AI-based systems can be operated remotely by emergency personnel and the collected data used for the development of intelligent functions. With time, the systems will become more and more autonomous and will eventually be able to improve through machine learning."

KIT notes that self-learning systems for use in life-hostile environments are still a niche market. Germany is well positioned in the development of these AI systems. The Life-Hostile Environments work group under the joint direction of Jürgen Beyerer (KIT and Fraunhofer IOSB) and Frank Kirchner (Robotics Innovation Center, German Research Center for Artificial Intelligence and the University of Bremen) identifies concrete action plans in its report to exploit the opportunities of self-learning systems in life-hostile environments and to serve worldwide markets with these self-learning robots. These plans range from setting up suitable infrastructures – such as comprehensive data pools and reference platforms – and promoting innovations through competition and technology demonstrators to creating standards for industry and research as well as making the procurement market more flexible.

— Also see The Self-Learning Systems in Life-Hostile Environments report; a multimedia report and info graphics on the Rapid Assistance in Rescue Operations application scenario; The "Moving Autonomously Under Water" info graphics can be downloaded at: https://www.plattform-lernende-systeme.de/anwendungsszenarien.html?file=files/img/Anwendungsszenarien/OffshoreWindkraft_webversion_20190225_1500.jpg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Confirmed: Global warming attributable to human activity, external factors

Source: http://www.homelandsecuritynewswire.com/dr20190628-confirmed-global-warming-attributable-to-human-activity-external-factors

June 28 – Researchers at the University of Oxford have confirmed that human activity and other external factors are responsible for the rise in global temperature.

While this has been the consensus of the scientific community for a long time, uncertainty remained around how natural ocean-cycles might be influencing global warming over the course of multiple decades. The answer we can now give is: Very little to none.

In a new study, published in the *Journal of Climate*, researchers at the Environmental Change Institute looked at observed ocean and land temperature data since 1850. Apart from human-induced factors such as greenhouse gas concentrations, other occurrences such as volcanic eruptions, solar activity and air pollution peaks were included in the analysis. Oxford saysthat the findings demonstrated that slow-acting ocean cycles do not explain the long-term changes in global temperature, which includes several decades of accelerated or slowed warming.

"We can now say with confidence that human factors like greenhouse gas emissions and particulate pollution, along with year-to-year changes brought on by natural phenomenon like volcanic eruptions or the El Niño, are sufficient to explain virtually all of the long-term changes in temperature," says study lead author Dr. Karsten Haustein. "The idea that oceans could have been driving the climate in a colder or warmer direction for multiple decades in the past, and therefore will do so in the future, is unlikely to be correct."

"Unfortunately, a number of previous studies have compared flawed observations with flawed modelling results to claim naturally occurring ocean cycles have played a large role in changes in the global temperature record," says Peter Jacobs, co-author on the study and Ph.D. student at George Mason University in the United States. "We show here that in fact there's little role for such cycles in explaining temperature changes when more accurate representations of both the temperature record and factors like volcanic eruptions, solar energy, and of course human activities are used. The climate system is endlessly interesting and no doubt has many mysteries left to explore, but this is really not one of them. Being sure that we're comparing like-with-like before jumping to the conclusion that there are discrepancies between our understanding of the climate and how it is behaving in the real world is a lesson we seem to have to relearn over and over again."

The study showed that global warming that occurred during the "early warming" period (1915 – 1945) was in fact caused by external factors as well. Formerly, it had been largely attributed to natural ocean temperature changes, which is why there has been uncertainty over how much of global warming is influenced by unpredictable natural factors.

"Our study showed that there are no hidden drivers of global mean temperature," says co-author Dr. Friederike Otto. "The temperature change we observe is due to the drivers we know. This sounds boring, but sometimes boring results are really important. In this case, it means we will not see any surprises when these drivers - such as gas emissions - change. In good news, this means when greenhouse gas concentrations go down, temperatures will do so as predicted; the bad news is there is nothing that saves us from temperatures going up as forecasted if we fail to drastically cut greenhouse gas emissions."

— Read more in Karsten Haustein et al., "A limited role for unforced internal variability in 20th century warming," Journal of Climate (16 May 2019).