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August 2020

Part B

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DIRTY R-NEWS

PART B Cover photo: Lebanese artist **Fatima Dia** is auctioning her painting of last week's tragic Beirut explosion, "Rising Angels," to help those affected by the blast which tore through the capital on Aug. 4 from the city's port area, killing over 135 and injuring thousands more. The artist will donate 100 percent of the proceeds to people who lost their homes and were affected by the blast.

Indian nuclear forces, 2020

By Hans M. Kristensen & Matt Korda

Bulletin of the Atomic Scientists 2020, Vol. 76, No. 4, pp.217–225

Source: <https://www.tandfonline.com/doi/pdf/10.1080/00963402.2020.1778378>

India continues to modernize its nuclear arsenal, with at least three new weapon systems now under development to complement or replace existing nuclear-capable aircraft, land-based delivery systems, and sea-based systems. Several of these systems are nearing

Type	NATO designation	Number of launchers	Year deployed	Range ^a (kilometers)	Warhead x kilotons yield	Number of warheads
Aircraft						
Vajra	Mirage 2000H	32	1985	1,850	1 x bomb	32
Shamsher	Jaguar IS	16	1981	1,600	1 x bomb	16
<i>Subtotal:</i>		48				48
Land-based ballistic missiles^b						
Prithvi-II	n.a.	30	2003	350 ^c	1 x 12	30
Agni-I	n.a.	20	2007 ^d	700+	1 x 40	20
Agni-II	n.a.	12	2011 ^e	2,000+	1 x 40	12
Agni-III	n.a.	8	2014?	3,200+	1 x 40	8
Agni-IV	n.a.	n.a.	(2020)	3,500+	1 x 40	n.a.
Agni-V	n.a.	n.a.	(2025)	5,200+	1 x 40	n.a.
<i>Subtotal:</i>		70				70 ^f
Sea-based ballistic missiles^g						
Dhanush	n.a.	2	2013	400	1 x 12	4
K-15	(Sagarika)	1/12	(2018)	700	1 x 12	12
K-4	n.a.	n.a.	?	3,500	1 x ?	0
<i>Subtotal:</i>		16				16
Total		134				150^h

completion and will soon be combat-ready. India is estimated to have produced enough military plutonium for 150 to 200 nuclear warheads but has likely produced only 150. Nonetheless, additional plutonium will be required to produce warheads for missiles now under development, and India is reportedly building several new plutonium production facilities. India's nuclear strategy, which has tradition-ally focused on Pakistan, now appears to place increased emphasis on China, and Beijing is now in range of Indian missiles.

Hans M. Kristensen is director of the Nuclear Information Project at the Federation of American Scientists where he provides the public with analysis and background information about the status of nuclear forces and the role of nuclear weapons. He specializes in using the Freedom of Information Act (FOIA) in his research and is a frequent consultant to and is widely referenced in the news media on the role and status of nuclear weapons. His collaboration with researchers at NRDC in 2010 resulted in an estimate of the size of the U.S. nuclear weapons stockpile that was only 13 weapons off the actual number declassified by the U.S. government.

Matt Korda is a Research Associate for the Nuclear Information Project at 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 HQ in Brussels. Matt is also the co-director of Foreign Policy Generation—a group of young people working to develop a progressive foreign policy for the next generation. He received his MA in International Peace & Security from the Department of War Studies at King's College London, where he subsequently worked as a Research Assistant on nuclear deterrence and strategic stability. He also completed an internship with the Verification, Training and Information Centre (VERTIC) in London, where he focused on nuclear security and safeguards.

Jihad in Central Asia and Russia: Foreign Fighters, the ISIS, Chechens, Katibat-i-Imam Bukhari, Al Nusra Front and the Prospect of Nuclear Terrorism

By Musa Khan Jalalzai

Source: <https://www.rieas.gr/images/terrorismstudies/terrorismpage2.pdf>

May 02 – In Central Asia, the focus of Jihadists groups has been the Tajikistan, Turkmenistan and Russian Federation. But it is unclear how many Central Asian fighters will ultimately seek to return to their countries of origin, and if they do, whether any of them will remain committed to ISIS. Before the rise of ISIS, the Islamic Movement of Uzbekistan (IMU) was the main Central Asian extremist organization in the field. Its base of operations is in Afghanistan and Pakistan. Central Asian fighters linked to ISIS headquarters in Syria also participated in acts of terrorism in other countries. The ISIS has previously restrained from getting involved in attacks in Central Asia as the group's leadership emphasised that attacking this region was not the highest priority. In July 2018, five Tajik men killed four foreign cyclists in a car-ramming attack, accompanied by an on-foot gun and knife assault in the Khatlon province of Tajikistan. The presence of Daesh in Iraq and Afghanistan, and participation of Central Asian jihadists in it prompted consternation in the region. In Syria, the radical Islamic militants from Central Asia established terrorist organisations of their own. These terrorists have Salafi-Wahhabi inclinations and are among the backers of al-Qaeda, al-Nusra Front, and Daesh group. In his Diplomat analysis (20 September 2016), Uran Botobekov, documented videos and extrajudicial killing in Iraq and Syria:



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

Musa Khan Jalalzai is a writer, journalist and, a research contributor in Research Institute for European and American Studies (RIEAS) Greece, and London. He has been contributing articles and research papers in Global Security Review USA, Journal of European and American Intelligence Studies, Daily Times, The Nation, Telegraph, Times of London, Daily Outlook Afghanistan, The New Nation Bangladesh, New Yorker, and Journal (Fautline) of the Institute for Conflict Management Delhi India since 1994. His intellectual experience is up to 30 years extensive research in political analysis, Pakistan, Afghanistan, terrorism, Taliban, the ISIS, nuclear and biological terrorism, and intelligence analysis. His skills cover counterterrorism, the EU and UK law enforcement analysis, and intelligence and security crisis in Asia and Europe.

UAE becomes first Arab nation to produce nuclear energy

Source: <https://www.thenational.ae/uae/uae-becomes-first-arab-nation-to-produce-nuclear-energy-1.1057355>

Aug 01 – The Barakah nuclear power plant in Abu Dhabi reaches a major milestone with one of the reactors now switched on. The UAE is the first Arab country to produce nuclear energy, after it was announced on Saturday that Unit 1 of the Abu Dhabi-based Barakah nuclear power plant is now operational.

Commercial operations of the reactor are expected to begin later this year, and will help power businesses and homes across the nation using clean energy.



Unit 1 is now using nuclear fuel to produce energy as part of the 'criticality' phase that was initiated on Friday. The reactor will be connected to the power grid and provide electricity during the upcoming testing phase.

President Sheikh Khalifa led congratulatory messages saying he was proud of the Emiratis involved.

"We are proud of this achievement and confident in the abilities of our young scientists...It is one of the inspiring moments we live today that will be remembered with great pride by generations to come," he said.

Earlier, Sheikh Mohammed bin Rashid, Vice President and Ruler of Dubai, announced the successful operation of the plant, on Twitter.

"Today we announce the UAE's success in operating the first peaceful nuclear reactor in the Arab world at Barakah Nuclear Plant Abu Dhabi," he said.

"The teams succeeded in loading nuclear fuel packages, running comprehensive tests and successfully beginning operation. I congratulate my brother Mohamed bin Zayed for this achievement.

"The goal is to operate four nuclear power plants that will provide one quarter of the country's energy needs in a safe, reliable and emission-free way.

"The UAE split the atom, and wants to explore the galaxy. Our message to the world is that the Arabs are able to resume their scientific ambitions and compete with the rest of the great nations. Nothing is impossible."

Sheikh Mohamed bin Zayed, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, congratulated the teams on Saturday, calling the milestone a proud moment.

"We proudly witness the start of Barakah nuclear power plant operations, in alignment with the highest international safety standards. Congratulations on realising this historic achievement in the energy sector and marking this milestone in the roadmap for sustainable development," he said.

Mohamed Al Hammadi, chief executive of Emirates Nuclear Energy Corporation, described the achievement as historic.

"It is the culmination of more than a decade of vision, strategic planning and robust program management. Despite the recent global challenges, our team has demonstrated outstanding resilience and commitment to the safe delivery of Unit 1. We are now another step closer to achieving our goal of supplying up to a quarter of our Nation's electricity needs and powering its future growth with safe, reliable, and emissions-free electricity," he said.

"Through the realisation of the vision of our leadership, the Barakah Nuclear Energy Plant has become an engine of growth for the Nation. It will deliver 25 percent of the UAE's electricity with zero carbon emissions while also supporting economic diversification by creating thousands of high-value jobs through the establishment of a sustainable local nuclear energy industry and supply chain."

He thanked the UAE's leaders and Enec's South Korean partners for their involvement and support.

Once the unit is connected to the grid, the nuclear operators will carry out continuous tests as they gradually raise the power levels, known as Power Ascension Testing.



Senior Reactor Operators and Reactor Operators who have been certified to safely operate the plant, alongside our international experts, to ensure the safe and sustainable operations of the unit for decades to come," he said.

Once the process is completed, over the course of a number of months, the plant will deliver abundant baseload electricity at full capacity to power the growth of the UAE for decades to come, reported state news agency Wam.

[Engineers at the Barakah Nuclear Power Plant Abu Dhabi after the first reactor was turned on. Courtesy: Sheikh Mohammed Twitter](#)

Ali Al Hammadi, chief executive of Nawah Energy Company, the operating and maintenance subsidiary of Enec, said the company was committed to upholding the highest degree of safety, quality and operational transparency.

"I am especially proud of our talented UAE National engineers and nuclear professionals who contributed to the construction of Unit 1, as well as the UAE National



The operating license for this phase was issued by the Federal Authority for Nuclear Regulation, who is overseeing the project, in February and is valid for 60 years.

Situated 280 kilometres away from the capital in Al Dhafra region, the power plant will produce enough electricity to cover 25 per cent of the country's energy needs. It will also prevent the release of 21 million tons of carbon emissions each year – equal to removing 3.2 million cars from the roads each year.

The station consists of four units that will supply a total of 5,600 megawatts of energy.

Currently, almost all of the country's energy comes from gas-fired power plants and some from solar fields.

The UAE is the first country in the Arab world and the 33rd globally to develop a nuclear energy plant to generate safe, clean, and reliable baseload electricity.

The country revealed its ambitions to pursue a nuclear energy programme in 2008 and construction has taken more than a decade. Hundreds of Emiratis have trained in South Korea, as part of UAE's long-term partnership with the Korea Electric Power Corporation, which is prime contractor and joint venture partner.

Overall construction of the power plant is nearly finished, with 94 per cent already completed.

Reactors 1 and 2 are ready, the third is 92 per cent completed and the last one is 85 per cent finished.

Can Israel Bomb Arab World's First Nuclear Plant in the UAE?

Source: <https://eurasianimes.com/after-iraq-syria-can-israel-bomb-arab-worlds-first-nuclear-plant-in-the-uae/>

Aug 03 – The UAE recently announced that it has commenced operations in the first of four reactors at the Barakah nuclear power station. However, Israel has not issued any public statement against the reactor or raised any concerns, knowing the fact that it vehemently opposes any project in the region that endangers its security.

Israel has been actively involved in maintaining its regional nuclear superiority with two key strategies: developing nuclear and other weapons of mass destruction and simultaneously denying its enemies any opportunity to develop one. This has shifted the balance of power in the Middle East almost completely towards Israel.

Recently, as reported by [EurAsian Times](#), a fire broke out at the Natanz nuclear facility in Iran last month. Iran claims it was a cyberattack organised by Israel or the US who have pledged to wipe out the Iranian nuclear program and eliminate all potential threats emanating from the Islamic nation.

Writing for [The Hill](#), Simon Henderson, a veteran researcher, a fellow at the Washington Institute for Near East Policy, believes that the explosion at Natanz has put the facility out of commission, and the Islamic Republic probably doesn't have an alternative to manufacture the advanced centrifuges.

When questioned about Israel being behind the attacks in Iran, PM Benjamin Netanyahu ignored the question while Defense Minister Benny Gantz said that Israel was not necessarily behind every incident in the region.

Israel's Operation Opera



The first clandestine operation by Israel against its neighbours' strategic nuclear assets can be traced back to the late 1970s when Israeli notorious spy agency – Mossad tried to sabotage the manufacturing of centrifuges in France – which were to be delivered to Iraq after an agreement was signed between two governments in 1974.

France agreed to build two nuclear reactors in Iraq, which had to be used for peaceful purposes. However, several intelligence inputs indicated Iraq's dangerous ambitions: building a hot cell laboratory to separate plutonium from radioactive rods and subsequent production of military-grade nuclear fuel.

This prompted Israel to take further military actions, launching Operation Opera in which surprise airstrikes were launched to destroy the [under-construction] Iraqi nuclear reactor near Baghdad.



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Operation Opera laid the foundation to counter-proliferation preventive strikes, which were made acceptable in Israel's policy and is commonly known as "Begin Doctrine".

Operation Outside the Box

The second time this doctrine was followed and implemented was in 2007 when Israel conducted similar airstrikes against a suspected Syrian nuclear facility in Deir Az-Zor named 'Operation Outside the Box'.

Israel only confirmed in 2007 that it destroyed a suspected nuclear reactor being built in Syria in 2007. The military said fighter jets bombed the al-Kibar facility in Deir al-Zour province, 450km north-east of Damascus, as it was neared completion.

Israeli PM Benjamin Netanyahu said Israel was determined to prevent its enemies from obtaining nuclear weapons. "The Israeli government, the Israel Defense Forces and the Mossad prevented Syria from developing nuclear capability. They are worthy of full praise for this," he had then tweeted.

"Israel's policy was and remains consistent – to prevent our enemies from arming themselves with nuclear weapons."

A notable feature about this operation was the lack of any international criticism or comments regarding the clandestine mission, however, Syria registered a formal complaint with the United Nations.

Currently, Israel is the only nation in the Middle East to have Nuclear weapons, although it has never formally accepted or denied its existence.

Additionally, in October 1973, during the Yom Kippur War, Israeli Prime Minister Golda Meir had reportedly authorized the activation of 13 nuclear warheads and their distribution with IAF units, to be used against Egypt and Syria, in case Israel was overrun.

The USSR was speculated to retaliate against Israel if nuclear weapons were used; dragging the United States into nuclear war against Russia as Washington had vowed security assistance to Israel.

India-Pakistan War

During the 1971 Indo-Pak War, India reportedly planned airstrikes against Pakistani nuclear facilities at Kahuta with Israeli assistance using Gujarat's Jamnagar airbase to launch its operations. The attack was given a green light by the then Prime Minister Indira Gandhi but was shelved due to reports leaking in international media.

This alerted Pakistani air defences around the Kahuta plant, which lost the element of surprise for the Indian Air Force.

Even in 1998, Israel was suspected to plan airstrikes against Pakistani facilities after its nuclear tests in May. Pakistan claimed to have spotted Israeli F-16s twice in its airspace days before the tests. It sparked fears of another Israeli airstrike on hostile nuclear facilities, a claim later rejected by Israel.

Nuclear Power Plant in the UAE?

The United Arab Emirates announced the commencement of operations at one of the four reactors at Barakah Nuclear Power Plant in Abu Dhabi. However, Israel has not issued any public statement against the reactor and is unlikely they will do so in the near future.

Although Israel-UAE relations don't exist officially, Israel does not see the latter as a threat to its sovereignty. The UAE has still not recognized Israel and denies its citizens entry into the country.

However, **both nations do agree on international stages against a common adversary, i.e. Iran.** The UAE is also engaged in a proxy war against Iranian-supported Houthi militia, backing the Southern Transitional Council forces in Yemen. It also mediated meetings between Mossad and Khalifa Haftar to negotiate Israeli military aid to LNA in Libya.



The relations among both nations have been boosted in recent years. An official diplomatic mission was opened by Israel in Abu Dhabi to aid in technologies related to renewable energy, in 2015. The UAE, Saudi Arabi and Israel are perceived by many to be in one group against the common adversary – Iran.

What Europeans believe about Hiroshima and Nagasaki—and why it matters

By Benoît Pelopidas and Kjølvs Egeland

Source: <https://thebulletin.org/2020/08/what-europeans-believe-about-hiroshima-and-nagasaki-and-why-it-matters/>



Japanese military leaders aboard the USS Missouri during the surrender ceremony in early September, 1945. Credit: Public Domain.

Aug 03 – Did the atomic bombings of [Hiroshima and Nagasaki](#) shorten the war, and were they necessary to force the Japanese surrender? Many people believe the answer to both questions is yes: In dropping the Bomb, America chose the lesser of two evils. Although historians have long challenged this narrative as wrong or misleading, a significant number of Europeans still believe it. That is the primary result of a recent survey of European views on nuclear affairs generally and the atomic bombings of Japan specifically. The survey, carried out in October 2019, involved approximately 7,000 respondents aged 18 and upward, carefully selected to ensure representative samples from Belgium, France, Germany, Italy, the Netherlands, Poland, Sweden, Turkey, and the United Kingdom.

The survey also shows that those who believe the bombings were necessary and effective at significantly shortening the war are more likely to harbor skepticism toward nuclear disarmament than those who do not. That being said, European publics remain on the whole staunch in their support for the elimination of nuclear weapons. Even in nuclear-armed France and the United Kingdom, large majorities reject the idea that nuclear weapons could



ever be used morally. Although others across the world may hold similar views, to date there has been no broad survey posing these questions in the United States or elsewhere. Future surveys could investigate whether the same pattern exists beyond Europe.

Interrogating the “Stimson narrative.”

The debate about the moral acceptability and military necessity of the atomic bombings of Japan began almost immediately after the end of the war. While the American public was broadly accepting of the government’s decision to use the atomic bomb, several commentators criticized it. As the historian Barton Bernstein has [documented](#), this criticism irked many of those responsible for the bomb’s development and use. The result was a coordinated campaign by a handful of wartime atomic policy makers, aimed at demolishing “the wrong kind of thinking.” Among the most influential contributions to this campaign was former US Secretary of War Henry Stimson’s February 1947 article in *Harper’s Magazine*, “The Decision to Use the Atomic Bomb.” Stimson’s article, as well as his memoir, published with McGeorge Bundy in 1948 (Bundy was also the uncredited co-author of the *Harper’s* piece), provided a starting point for historians seeking to make sense of the [decision-making process](#) that led to the atomic bombings in August 1945. The story told by the former secretary of war and his allies was the following: After careful deliberation, American authorities decided that the use of atomic bombs would be the lesser of two evils. According to Stimson’s calculation, the choice to use atomic weapons was “a decision that brought death to over a hundred thousand Japanese.” However, Stimson [argued](#), the bombings spared America, her allies, and the world at large of what would inevitably have been a gruesome invasion of the Japanese home islands. “I was informed,” Stimson wrote, that an invasion “might be expected to cost over a million casualties, to American forces alone. Additional large losses might be expected among our allies, and, of course, if our campaign were successful and if we could judge by previous experience, enemy casualties would be much larger than our own.” Ultimately, the destruction of Hiroshima and Nagasaki “put an end to the Japanese war.”

The Stimson narrative has since been challenged by several historians on multiple grounds. First, it does not appear that the US executive spent much time deliberating whether atomic weapons should be used or not. Discussions instead focused on how, when, and where they would be employed.

Second, Stimson’s utilitarian calculation appears to be based on numbers overly flattering to his own case. According to [declassified documents](#), the US military estimated in June 1945 that a full-scale invasion of the Japanese home islands, in the worst-case scenario, could be expected to incur up to 220,000 casualties—quite far from Stimson’s “over a million.” Moreover, of the 220,000 casualties, only 46,000 were projected as fatalities. The number of people killed in Hiroshima and Nagasaki, on the other hand, was probably [at least twice as high](#) as the “over a hundred thousand Japanese” reported by Stimson in 1947.

Third, the idea that the US government was faced with only two options in August 1945—full invasion or atomic bombing of Japanese population centers—has little basis in reality. Alternative courses of action, not mutually exclusive, would have included negotiations, a [demonstration](#) of the atomic bomb in an uninhabited area, continued strategic bombing short of the use of atomic weapons, continued economic blockade, and waiting for the Soviets to declare war against the Japanese empire.

Fourth, it is not clear that the atomic bombs were in fact responsible for the Japanese surrender. The Japanese war cabinet had over an extended period of time been divided between a “peace party,” which argued that Japan should seek an end to the war as quickly as possible, and a “war party,” which argued the war should be continued as Japan sought good offices from the Soviet Union to negotiate a peace deal with the United States and Britain. In the view of the acclaimed historian Tsuyoshi Hasegawa, who [consulted primary sources in Japanese](#), it was the Soviet Union’s breach of the Soviet–Japanese Neutrality Pact and attack against Japan on August 9, 1945 that tipped the scale and forced the emperor’s decision to surrender the very next day (the final decision was formalized a few days later, following discussions within the Japanese executive). In the absence of the Soviet invasion, Hasegawa concludes, the two atomic bombs would “most likely not have prompted the Japanese to surrender, so long as they still had hope that Moscow would mediate.”

The historian John Dower [concurs](#): The Soviet entry into war was more important than the atomic bombing in producing Japanese surrender. Once the Soviets intervened, the Japanese appear to have favored surrendering to Washington over allowing Moscow to conquer their country. At the same time, from the perspective of the Japanese government, the atomic bombings provided an opportunity to frame the Japanese military’s shattering defeat as a result not of its own incompetence, but as an outcome of the introduction of a new and revolutionary weapon by the enemy. In Dower’s [words](#), the atomic bombings allowed the Japanese emperor to spin the capitulation as “nothing less than a magnanimous act that might save humanity itself from annihilation by an atrocious adversary.”

In fact, according to the US Air Force’s [own review](#), finalized not long after the end of the war, Japan would likely have surrendered that same autumn even in the absence of atomic bombings or an invasion. Similarly, the Joint Chiefs of Staff [expressed skepticism](#) about the use of atomic bombs both before and after the fact.

In summary, many of the central claims on which the official story about Hiroshima and Nagasaki is founded—that the atomic bombings were necessary to end the war, that they



ended a conflict that otherwise would have slogged on, and that they saved a large number of American soldiers' lives—appear to rest on shaky ground. While certain aspects of the story stand up to scrutiny, others have been proven plain wrong, and others remain contested by scholarship. But have people caught up with the historiography?

European views on the atomic bombings of Japan

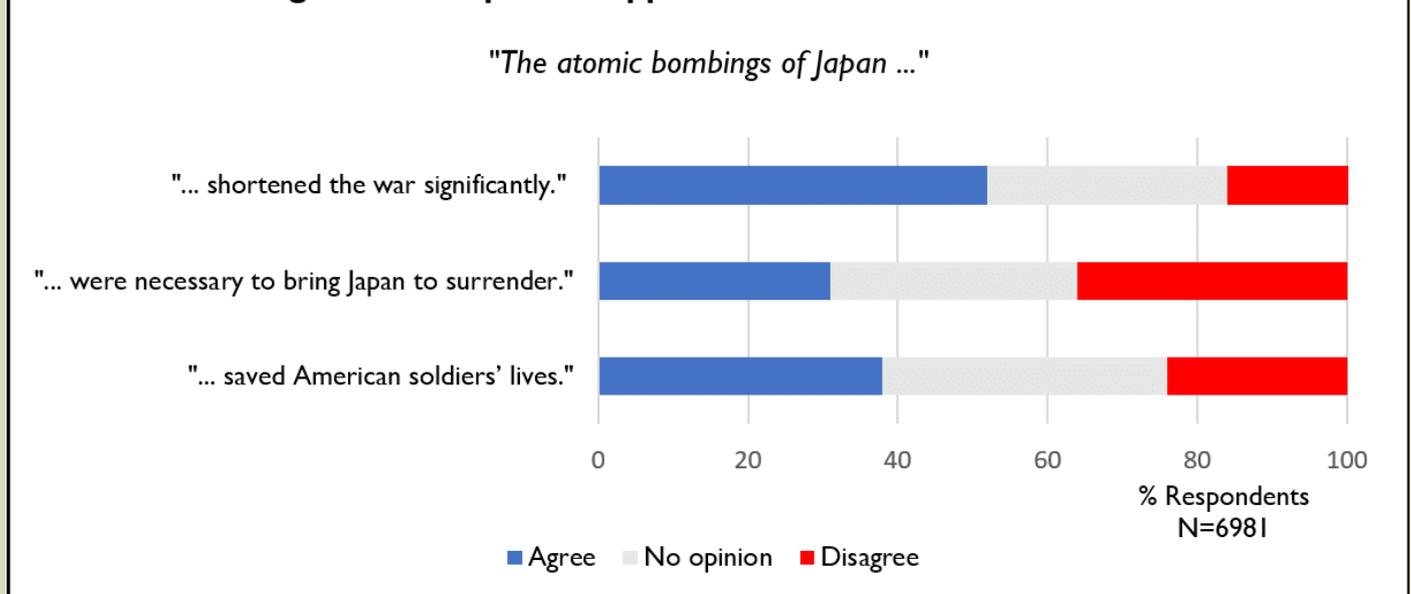
Asked to note their agreement or disagreement with the statement that “the atomic bombings of Japan in World War II shortened the war significantly,” 23 percent of respondents to the October 2019 survey “strongly” agreed, 29 percent “somewhat” agreed, 31 percent reported no opinion, 9 percent “somewhat” disagreed, and 8 percent “strongly” disagreed. In other words, while 52 percent of respondents expressed support for the idea that the war was significantly shortened by the atomic bombings, only 17 percent pushed back against that idea.

Regarding the question of whether “the atomic bombings of Japan in World War II were necessary to bring Japan to surrender,” the survey results were more balanced. 12 percent of respondents “strongly” agreed, 19 percent “somewhat” agreed, 33 percent reported no opinion, 15 percent “somewhat” disagreed, and 21 percent “strongly” disagreed.

On the statement, “The atomic bombings of Japan in World War II saved American soldiers' lives,” 14 percent of respondents expressed that they “strongly” agreed, 25 percent that they “somewhat” agreed, 38 percent reported no opinion, 11 percent expressed that they “somewhat” disagreed, and 13 percent expressed that they “strongly” disagreed.

Finally, asked to note their agreement or disagreement with the statement that “the atomic bombings of Japan in World War II killed innocent civilians,” 71 percent of respondents to the 2019 survey “strongly” agreed, 14 percent “somewhat” agreed, 12 percent expressed no opinion, and less than 5 percent “strongly” or “somewhat” disagreed.

Figure I: Europeans' support for the "Stimson narrative"



The results suggest that the Stimson narrative still holds sway among Europeans, but that support might be weakening over time. On each statement, older respondents were slightly more likely than younger respondents to express agreement with Stimson's interpretation of the atomic bombings.

Finally, it bears mentioning that British respondents stand out among the nine European populations sampled as the greatest believers in the Stimson narrative. The results unfortunately do not give further insight into the causes of this tendency, but three mutually reinforcing hypotheses are plausible. First, the shared language of the United States and the United Kingdom allows narratives and talking points to travel relatively frictionless across borders. Second, the United Kingdom [was directly involved](#) in the building of the atomic bomb through the Manhattan Project and, by extension, partly responsible for the fates of the people of Hiroshima and Nagasaki. Patriotic Brits may therefore be more susceptible to wishfully thinking that the bombings were decisive in ending the war and saving lives. An indication of this may be that, according to the survey data, Brits who express disagreement with the statement “I see myself as part of the European Union” are significantly more likely to subscribe to the constitutive claims of the Stimson narrative. Third, the same kind of mechanism could operate vicariously through the US–British “special relationship”: British respondents, through affective identification with the US position, were predisposed to accepting the narrative that the bombings were meaningful and thereby justified. It is notable



that the British public holds significantly stronger support for the Stimson narrative than do the French—citizens of Western Europe's other nuclear-armed state.

Attitudes toward nuclear disarmament

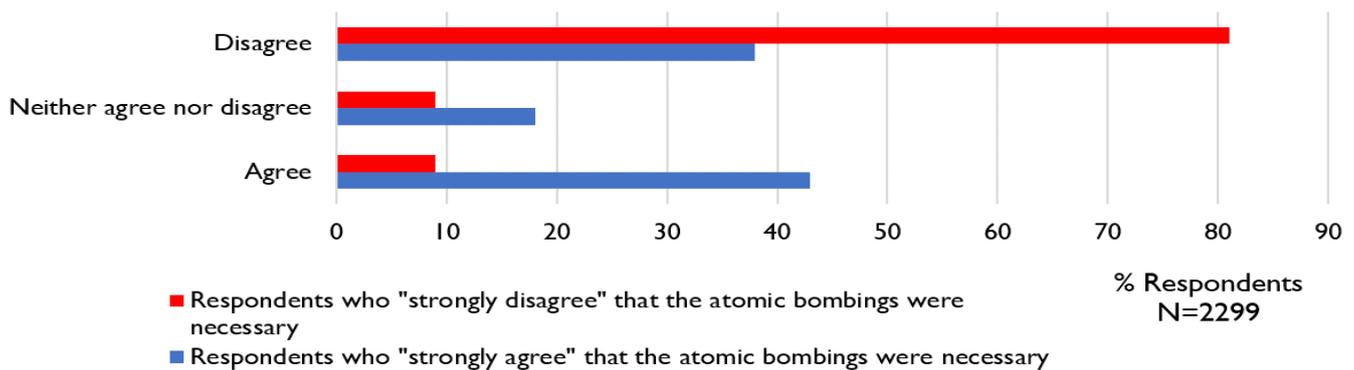
European publics have long offered [strong support](#) for arms control and the elimination of nuclear weapons. This pattern is further corroborated by the survey data, which show consistent support for nuclear disarmament. While 74 percent of respondents expressed support for “an international agreement for eliminating nuclear weapons,” only 6 percent expressed opposition (the rest reporting no opinion). On the statement “It is desirable to eliminate all nuclear weapons worldwide within the next 25 years,” 60 percent expressed “strong” agreement and 20 percent agreed “somewhat.” And while 13 percent expressed that they neither agreed nor disagreed, only 7 percent “strongly” or “somewhat” disagreed.

The support for disarmament is robust and consistent: 81 percent of respondents who strongly agreed with the goal of eliminating nuclear weapons within 25 years also offered strong support for an agreement to eliminate nuclear weapons. Perhaps unsurprisingly, of the populations sampled, enthusiasm for the goal of disarmament was highest in Germany, where 76 percent “strongly” agreed with the notion that the elimination of nuclear weapons would be desirable, and lowest in France, where about half the population, 49 percent, expressed “strong” agreement (and an additional 28 percent agreeing “somewhat”).

However, there is clear relationship between degree of faith in the Stimson narrative and support for the abolition of nuclear weapons. Respondents who said the atomic bombings shortened the war significantly, were necessary to bring about the Japanese surrender, or saved American soldiers' lives were significantly more likely to believe that the abolition of nuclear weapons would “make the world less safe” compared to those who did not express such views.

Figure 2: Views on abolition by support for the Stimson narrative

“The abolition of nuclear weapons will make the world less safe”



For example, among respondents who expressed “strong agreement” with the idea that the atomic bombings were “necessary” to bring the war to an end (12 percent of the total number of respondents), 43 percent agreed that abolition would make the world less safe and 38 percent disagreed. By contrast, among respondents who expressed “strong disagreement” with the notion that the atomic bombings were necessary (22 percent of the total number of respondents), only 9 percent agreed that abolition would make the world less safe while 81 percent disagreed.

On the question of which strategies states without nuclear weapons should use to protect themselves in a nuclear-armed world, believers in the Stimson narrative were also significantly less likely to pick “Advocate for the abolition of nuclear weapons” as one of their favored options. (Other options included “seek protection by the nuclear weapons of their allies,” “develop their own nuclear weapons for self-defense,” “receive guarantees that nuclear weapons will never be used against them,” “build a strong conventional arsenal but not nuclear weapons,” and “request protection from allies without asking for the use of nuclear weapons.” Multiple answers were possible.) Conversely, respondents who do not accept the Stimson narrative were more likely to pick advocacy for abolition as a reasonable security strategy for non-nuclear-weapon states.

The data also show statistically significant correlations between, on the one hand, the beliefs that the atomic bombings saved American soldiers' lives and were necessary to force the Japanese to surrender, and, on the other, lower levels of support for the statement that “it is desirable to eliminate all nuclear weapons worldwide within the next 25 years.” Those who believe the bombings were necessary and saved American soldiers' lives are also more likely than those who do not



hold such views to disagree with the statement, “I support an international agreement for eliminating all nuclear weapons.”

All of this said, however, a majority of respondents, including a majority of believers in the Stimson narrative, favor abolition. In other words: Most believers in the Stimson narrative do not oppose disarmament, but most opponents of disarmament believe in the Stimson narrative.

Asked whether there are “any circumstances in which the use of nuclear weapons is morally acceptable” (a question that was only asked of French and British respondents), 79 percent responded that “it is never morally acceptable to use nuclear weapons.” Only 21 percent responded that, “under certain circumstances, it might be morally acceptable to use nuclear weapons.” This may be taken as an indication that support for the Stimson narrative does not translate into moral support for the use of nuclear weapons in the future.

But for those who maintain that nuclear weapons might be used morally, which conditions do they identify as valid for the use of such arms? Of the 21 percent of respondents who expressed that the use of nuclear weapons might be morally acceptable under certain circumstances, 50 percent submitted “If the existence of my country is in peril,” 45 percent submitted “As a response to a nuclear strike,” 16 percent submitted “If an allied country is attacked,” and 35 percent submitted “To defeat terrorist groups.” 45 percent—amounting to 9 percent of all respondents—submitted the scenario that most resembles the Stimson narrative about the atomic bombings of Japan: “To end a war, if doing so saves lives.”

Future memories of Hiroshima and Nagasaki

A last but crucial question is whether memories of Hiroshima and Nagasaki are likely to endure in the future. Asked to identify which city or cities were bombed with nuclear weapons during World War II, 85 percent of respondents to the 2019 survey correctly identified Hiroshima and 67 percent correctly identified Nagasaki.

There is, however, a notable correlation between being able to identify the correct cities and age; older respondents are more likely than younger respondents to know that Hiroshima and Nagasaki were targeted. For example, while 80 percent of respondents aged 70 or older correctly identify Nagasaki as having been bombed, only 53 percent of respondents under the age of 20 were able to remember Nagasaki. The fact that Nagasaki is less frequently identified than Hiroshima in every country (the difference amounts to 18 percent of respondents overall and varies from 11 to 23 percent depending on the country) may have an impact on the meaning people assign to atomic weapons and bombings, which vulnerabilities they take into account, and the possibilities for the future development of nuclear policy.

Beyond accuracy’s sake, recent discoveries about Nagasaki bring an important dimension to nuclear politics that is often overlooked: the vulnerability of nuclear command and control and the role of luck in the outcome of nuclear events. While the attack on Hiroshima was well planned and executed, the opposite is true for the one on Nagasaki, which was originally just a secondary target and ended up being struck by a bomber heading for Kokura. The causes of that in-flight change remain debated, but even years later, the head of the Manhattan project, Lt. Gen. Leslie Groves, was not able to understand why Nagasaki ever became the target. Even after the change, ground zero ended up being some [three-quarters of a mile off target](#).

So, [remembering Nagasaki](#) opens up a space for thinking about the vulnerability of the command and control of nuclear operations and the [possible role of luck](#) in some of their outcomes. Whether or not Nagasaki features in the narrative can shift the memory of the bombings from a story of strategic rationality, calculated decision making, and military planning and implementation to a story of errors, contingency, and bad luck for Nagasaki and [good luck for Kokura](#).

While the bombings of Hiroshima and Nagasaki are often portrayed as the epitome of the material vulnerability of human societies to nuclear weapons, those societies are also vulnerable to forgetfulness, misremembering, and myth-making, creating a gap between warranted and actual levels of confidence in particular claims. Seventy-five years after the events—and in spite of the progress of historical scholarship—the Stimson narrative continues to hold sway among large sections of the public, shaping views on nuclear policy issues. By contrast, nuclear close calls and enduring weaknesses in the command and control of nuclear operations dating back all the way to the bombing of Nagasaki tend to be overlooked. It is the [responsibility](#) of scholars and educators to work against such epistemic vulnerability to expose citizens to the latest advances of knowledge so that they can independently form their political views.

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research has appeared in a number of scholarly journals and concerns topics such as treaty-making processes, nuclear history, and emerging military technologies.

Memorial Days: the racial underpinnings of the Hiroshima and Nagasaki bombings

By Elaine Scarry

Source: <https://thebulletin.org/2020/08/memorial-days/>



A barefoot boy waiting in line and staring ahead at a crematorium after the Nagasaki bombing, with his dead baby brother strapped to his back. Photo by US Marine photographer Joe O'Donnell

Aug 03 – This past Memorial Day, a Minneapolis police officer knelt on the throat of an African-American, George Floyd, for 8 minutes and 46 seconds. Seventy-five years ago, an American pilot dropped an atomic bomb on the civilian population of Hiroshima. Worlds apart in time, space, and scale, the two events share three key features. Each was an act of state violence. Each was an act carried out against a defenseless opponent. Each was an act of naked racism.

The first two features—the role of the state and the impossibility of self-defense—probably require little elaboration. Each was an act of state cruelty: In one case, the agents of the state acted on home ground and in the other, on foreign ground. Each was carried out against a defenseless opponent: George Floyd's hands were handcuffed behind him; he was not resisting arrest or putting the police officers at risk or even verbally challenging them; he used his voice merely to plead that he be permitted to breathe, then called out to his dead mother, whom he soon joined. Nor could the long line of executed black Americans who preceded George Floyd defend themselves: Breonna Taylor's work as an emergency medical technician entailed, on a daily basis, protecting both herself and her patients, but she could not, fast asleep in bed, carry out any self-defense when Louisville police, without warrant, burst through her doors after midnight and shot her eight times.

The now widely shared recognition that police racism within the United States is not just the practice of individual officers but is instead systemic entails the recognition that African-Americans, in their interactions with the police, have ceased to have the right of self-defense, the right that arguably underlies every other right. Persons of color in the United States—including Native Americans, whose rate of death at the hands of police is the highest of any racial group^[1]—cannot defend themselves. Seeing that one is about to be slain, one may try to resist (to run, to refuse handcuffing, to flail out with arms or weapon), but that resistance will then be retroactively used to justify the slaying that was already underway. One's only choice is to comply or to resist—in other words, to be slain or to be slain.

Self-defense was not an option for any one of the 300,000 civilian inhabitants of the city of Hiroshima, nor for any one of the 250,000 civilians in Nagasaki three days later. We know from [John Hersey's classic Hiroshima](#) that as day dawned on that August morning, the city was full of courageous undertakings meant to increase the town's collective capacity for self-defense against conventional warfare, such as the clearing of fire lanes by hundreds of young school girls, many of whom would instantly vanish in the 6,000° C temperature of the initial flash, and others of whom, more distant from the center, would retain their lives but lose their faces.^[2] The bombing of Hiroshima and Nagasaki initiated an era in which—for the first time on Earth and now continuing for seven and a half decades—humankind collectively and summarily lost the right self-defense. No one on Earth—or almost no one on Earth^[3]—has the means to outlive a blast that is four times the heat of the sun or withstand the hurricane winds and raging fires that follow.



Is it accurate to designate self-defense the right underlying every other right? Freedom of speech matters for thousands of reasons, but at its most elementary, it matters because it increases one's chance of defending oneself and by this act, surviving. The same is true of the right of free press, the right of free assembly, the right to a fair trial, the right not to be subject to warrantless search and seizure: Each has a vast array of benefits, but the bottom line is that each amplifies the right of self-defense, the right to protect and thereby perpetuate one's own life. Centuries of political philosophers have asked, "What kind of political arrangements will create a noble and generous people?" Surely such arrangements cannot be ones where a handful of men control the means for destroying at will everyone on Earth from whom the means of self-defense have been eliminated.

The third link between Memorial Day 2020 and August 6 and 9, 1945 is the racism that made each event possible. Racism is a perceptual deformation that results in the judgement that people of a given skin color or ethnic derivation are not simply less deserving (of jobs, education, money, medical care, trust, responsibility, forgiveness, sympathy) but are, in a word, expendable. Lynch them, choke them, burn their faces off; we can do a follow-up study later.

When Americans first learned that the people of Hiroshima and Nagasaki had been collectively vaporized in less time than it takes for the heart to beat, many cheered. But not all. Black poet Langston Hughes at once recognized the moral depravity of executing 100,000 people and discerned racism as the phenomenon that had licensed the depravity: "How come we did not try them [atomic bombs] on Germany... They just did not want to use them on white folks."^[4] Although the building of the weapon was completed only after Germany surrendered on May 7, 1945, Japan had been designated the target on September 18, 1944, and training for the mission had already been initiated in that same month.^[5] Black journalist George Schuyler wrote: "The atom bomb puts the Anglo-Saxons definitely on top where they will remain for decades"; the country, in its "racial arrogance," has "achieved the supreme triumph of being able to slaughter whole cities at a time."^[6] Still within the first year (and still before John Hersey had begun to awaken Americans to the horrible aversiveness of the injuries), novelist and anthropologist Zora Neale Hurston denounced the US president as a "butcher" and scorned the public's silent compliance, asking, "Is it that we are so devoted to a 'good Massa' that we feel we ought not to even protest such crimes?"^[7] Silence—whether practiced by whites or people of color—was, she saw, a cowardly act of moral enslavement to a white supremacist.

Each of these three passages, and scores of others, are documented in Vincent Intondi's brilliant history, [African-Americans Against the Bomb](#), which chronicles the repudiation by the Black community of nuclear arms from the 1940s up through President Obama's April 5, 2009 Prague speech: jazz saxophonist Charlie Parker, composer and pianist Duke Ellington, civil rights and gay activist Bayard Rustin, poet-novelist James Baldwin, playwright Lorraine Hansberry, civil rights leader Rev. Martin Luther King, and sociologist and pan-Africanist W.E. B. DuBois are among those who spoke out decisively and often. During these same decades, many white people also spoke out against the moral depravity of nuclear weapons, some even suffering terrible costs similar to those suffered by, for example, DuBois, who because of his ardent denunciation of the American nuclear arsenal was at various points arrested, accused of being an unregistered foreign agent, denied a passport, and eventually prompted to expatriate to Ghana.^[8] But African-Americans, in addition to educating all who would hear about the moral depravity of the inflicted injuries, have also sought tirelessly to educate the country about the racial scaffolding that provides the gantry on which the missiles are launched.

Some readers will [recognize as self-evident](#) the US addiction to white racial supremacy that was at work in the flattening of [Hiroshima and Nagasaki](#) and that today supports the country's prodigious nuclear arsenal, currently undergoing a 1.2 trillion dollar renewal.^[9] But other readers—even some who perceive the moral turpitude of nuclear weapons and who work tirelessly for their dismantlement—may be reluctant to recognize that racism. After all, we know nuclear weapons stand to eliminate all humans on Earth, not those of one or another race. Americans and Russians, who together possess more than 93 percent of the world's nuclear arsenal, have long been designated as one another's major opponent, and Russians are often loosely described as racially white (even though they, like the American people, are made up of many different ethnic groups). That nuclear war stands a high chance of being instigated by accident or by appropriation of the weapons by a hacker or nonstate actor may seem to make the conscious and unconscious racial biases of a United States president or nuclear command chain irrelevant.

But three lists—the list of geographies where US presidents have contemplated launching a first strike, the list of geographies where the United States has tested its bombs, and the list of countries that the United States condemns for their aspiration to acquire nuclear weapons—may, like avenues of insight radiating outward from Hiroshima and Nagasaki, help to make the racial underpinnings of the nuclear architecture unmistakable.

First, then, the geographies where we know presidents have contemplated first strikes. Eisenhower considered using an atomic weapon in the Taiwan Straits in 1954. The record of his statements in private meetings shows the presence of race, whether he was at any given moment explaining why he might use the weapon or instead why he might abstain from its use: "The President said that we must recognize the Quemoy is not our ship. Letters to him constantly say what do we care what happens to those yellow people out there."^[10] Nixon tells us he contemplated ordering a first strike four times during his presidency. Although he did not name all four targets, we know one in 1969 was North Korea.^[11] He contemplated striking North Vietnam in 1972.^[12] Lyndon Johnson contemplated the launch of a nuclear weapon against China



to prevent China from acquiring a nuclear weapon.^[13] To this list may be added the times when US presidents have threatened a first strike, as when the George H.W. Bush administration during the first Gulf War informed Saddam Hussein that if he used chemical weapons, nuclear missiles were positioned to strike his country.^[14]

Like the countries US presidents have chosen for a first strike, the US selection of nuclear testing sites indicates a belief that people of color are expendable. The painful instance of the Marshall Islands is succinctly summarized by *The Washington Post's* Dan Zak: "[T]he United States tested 67 high-yield nuclear bombs between 1946 and 1958, resettling whole islands of Marshallese people, exposing many to radioactive fallout and bequeathing exile and ill health to ensuing generations."^[15] One of the bombs was 15 megatons. Describing the total impact of the 67 tests, Zak reckons, "If their combined explosive power was parceled evenly over that 12-year period, it would equal 1.6 Hiroshima-size explosions per day."^[16] The picture is not more heartening when one turns to tests carried out on US soil. On the arrival this summer of the 75th anniversary of the July 16, 1945 Trinity test in New Mexico, observers noted the racial distribution: "It should come as no surprise that the downwinders of Trinity were largely impoverished agricultural families, mostly Hispanic and Native."^[17] As in New Mexico, so in Nevada. A study published in the medical journal *Risk Analysis* concludes, "Native Americans residing in a broad region downwind from the Nevada Test Site during the 1950s and 1960s received significant radiation exposures from nuclear weapons testing."^[18]

The third list is the sequence of countries we have condemned because their leaders and scientists have aspired to develop a nuclear weapon. The United States has treated these aspirants, in each case, people of color—Iranians, Iraqis, Libyans, North Koreans—as immoral, despite our own vast nuclear architecture and despite our 1995 statement at the International Court of Justice that our having a nuclear arsenal, threatening to use it, using it, and using it first do not violate international covenants such as the UN Convention on the Prevention and Punishment of the Crime of Genocide.^[19] The United States sometimes bases its indignation toward nuclear aspirants on the fact that the acquisition of a nuclear weapon by yet another country will violate the Non-Proliferation Treaty (NPT); it righteously announces this violation while relentlessly overlooking the fact that it has for 50 years been in violation of that treaty, which requires, as one of its major pillars, that existing nuclear states dismantle their own arsenals.

A recent article in *The Atlantic* reports new neuroscience research suggesting that people holding positions of power may suffer brain damage, the incapacitation of mirror neurons that ordinarily enable one to comprehend the position of another person or people.^[20]

A country that has 6,000 nuclear weapons while savaging North Korea for having fewer than 30; a country that has 12 Ohio-class submarines each carrying the equivalent of 4,000 Hiroshima blasts while going to war against Iraq on false evidence that it might have material that could lead to a single nuclear weapon; a country that can't be bothered to commemorate August 6 and August 9 and the hundreds of thousands incinerated on those days, yet clucks and scolds about Iranian nuclear projects, imposes sanctions, and unleashes a Stuxnet digital worm that subverts Iran's uranium enrichment plant;^[21] a country that persuades Libya to dispose of its nuclear materials and after it does so, swoops in to help assassinate the country's leader, might well appear to be a country whose governors—and perhaps, too, some in its population—no longer have functioning mirror neurons.

When this soul-destroying asymmetry is pointed out, the United States says, "Yes, but they (i.e., those people of color) may use them, while we (i.e., we white people in charge of the United States) will not use them," a manifestly incoherent statement since it is only the United States who has used them, and used them twice.^[22] Extreme alarm incited by picturing nuclear weapons in the hands of yet-one-more country rarely kicks in when the United States distributes its own weapons to NATO allies, currently Germany, Belgium, Netherlands, Italy (Turkey, too, has US nuclear weapons, but many were removed after 2000 and those that remain have since 2016 become a source of mounting worry^[23]). Since these four countries are traditionally viewed as white-majority peoples, the danger of reckless use is apparently non-existent; the proliferation of the weapons to these countries does not, in the US view, violate the Non-Proliferation Treaty. In a feat of double think that might have startled even George Orwell, they calmly acknowledge that in the event of war (when the NATO sharing countries will be called upon to participate in the delivery of those weapons), the Non-Proliferation Treaty will cease to be in effect.^[24]

So, we return to the question: What kind of political arrangements will create a noble and generous people? What kind of arrangements will restrain a country from egregious mass killings in the future? Will enable that country to face responsibility for injuries it has in the past inflicted on home ground (on Native Americans and African Americans), and on foreign ground (the people of Hiroshima and Nagasaki)? Will help them to dedicate themselves to dismantling mis-trained and militarized police teams roving their cities and dismantling the nation's nuclear architecture? These accomplishments are momentous and difficult but surely also minimal if we aspire to one day become a great and good people.

Langston Hughes voiced the opinion that until racial injustice on home ground in the United States ceases, "it is going to be very hard for some Americans not to think the easiest way to settle the problems of Asia is simply dropping an atom bomb on colored heads there."^[25] While his statement was made in 1953, near the eighth anniversary of the Hiroshima and Nagasaki bombings, it remains equally relevant today, as we approach the 75th anniversary: Then, as now, the safety of the Korean people (among other peoples) was at issue. The cruelty daily inflicted on people of color in our own city streets acts as a mental



rehearsal for carrying out large-scale slayings abroad. It keeps our capacity for cruelty limber; it dulls the mind and gives us practice in pronouncing the word “expendable.”

Langston Hughes might have with equal accuracy noted the reverse. Our cruelty abroad hardens our hearts, enabling us to tolerate the spectacle of everyday racial injustice at home. Americans, seeing our country boast a vast nuclear architecture that has no other purpose than the instant elimination from Earth of large civilian populations—the launch codes day and night casually tucked in our president’s pocket—consciously or unconsciously absorb the power lesson, suffer the same brain deterioration, and now become dull-witted about whether Native American and Black lives any longer even matter.

A just state is a state that makes its population care to be just. Can a nuclear country inspire its population to be just? Doesn’t that very nuclear architecture require its population to lose its perceptual acuity? If one keeps one’s eyes on the monumental apparatus moment by moment, that will induce incapacitating shame and terror (as happened in the first two decades after Hiroshima and Nagasaki, when the horror of the weapons and, simultaneously, of racial injustice at home, was day by day on peoples’ minds). Instead, vision has now contracted to a narrow band of bearable possibilities that, in its very narrowness, necessitates an ethical dumbing down.

If the charge of a self-imposed dumbing down seems fanciful, it may be helpful to consider recent critiques of the country’s nuclear policy establishment. This establishment has the virtue—a virtue practiced by too few in the population—of remaining aware of the country’s nuclear arsenal; but it does so by constricting its field of vision. Anthropologist Hugh Gusterson, a longtime observer of nuclear scientists and policy communities, in early 2019 described in the pages of the *Bulletin of Atomic Scientists* a large assembly in Washington’s Brookings Institute that gathered to hear an all-star, five-person panel address “the Politics of New Start and Strategic Modernization.” The five, he reports, delivered five nearly identical lectures, only debating “the semantics of whether [the] pairing of nuclear modernization and arms control should be characterized as the product of a ‘consensus’ or a ‘coalition.’”^[26] A related critique has been made by French political scientist Benoît Pelopidas, who describes, as his title announces, “Nuclear Weapons Scholarship as a Case of Self-Censorship in Security Studies.” Despite the absence of any externally imposed prohibition on free discourse or constraints on argument, the community voluntarily contracts the frame of reference to bypass all normative considerations and to avoid contemplating the possibility of radical reordering of the world, such as by nuclear abolition. Two terms—“non-proliferation” and “deterrence”—are relentlessly used as tools to corral the discussion into a narrow perimeter of business-as-usual thinking that invalidates as unrealistic any alternative idea, thereby eliminating any sense of obligation to the future.^[27]

The death of George Floyd has brought about, among many other outcomes, a commitment to change the nuclear policy arena. In the summer of 2020, a cascade of American foreign policy and national security institutions, including the *Bulletin of Atomic Scientists*, signed the statement authored by the Women of Color Advancing Peace, Security and Conflict and agreed to carry out a host of reforms, such as making sure institutions dedicated to peace and security “diversify our boards of directors and advisory committees,” acknowledge the harmful effects of “microaggressions” against people of color in the workplace, and “call out racism and share the burden of dismantling white supremacy.”^[28]

While the list of resolutions emphasizes changes in the workplace and governing boards of these institutions, it may be that these changes will in turn bring about a recognition of the place of racism in the very philosophies of international relations and nuclear weapons. The obligation to “call out racism and share the burden of dismantling white supremacy” should carry with it the obligation to recognize the racist foundation of the nuclear architecture itself (a northern hemisphere blanketed by nuclear states, a southern hemisphere blanketed by nuclear weapons-free zone treaties) and to dismantle it, beginning with the two states that hold 93 percent of all the weapons.

Most nights during the summer of 2020, Black Lives Matter vigils take place, not only in cities but in small towns across the country. In Arlington, Massachusetts, for example, people stand, masked and at safe distances from one another, along the broad main avenue from 6 p.m. to 7 p.m., while a stream of bicycles and cars signal by waves and horns and thumbs up their affirmation of the signs: “Breonna Taylor.” “Raychard Brooks.” “George Floyd.” “Say Their Names.” “Not One More.” “No Justice, No Peace.” In the last 8-minutes and 46 seconds of the hour, people drop to one knee and only stand again when the church bells announce the closing of the hour. The posture is one inherited from decades of civil rights practice (initiated by Martin Luther King, Jr., then made new by Colin Kaepernick and black NFL players); the temporal duration is a direct reference to the killing of George Floyd, as though by duplicating the kneeling of the policeman we could back up and reverse its intent and its outcome. The posture expresses an array of feelings: sorrow at George Floyd’s death, a counterfactual wish that it had not happened (let his breathing be restored), shame at not having collectively perceived the scale of the injuries for so long, and a commitment to reinvent a form of policing that nourishes and assists, rather than preys upon, our towns and cities.

Perhaps something like this same gesture could be carried out—in the privacy of one’s home or on Main Street or in parks and spaces of public assembly—at 8:15 a.m. on August 6th and 11:02 a.m. on August 9. Carried out: out of sorrow for those slain and those hideously wounded, out of remorse for not having faced the injuries sooner, out of a shared commitment to dismantle the nuclear architecture so that we need only commemorate, and



never again re-enact, what took place on those days. What would be an appropriate duration? Perhaps 53 seconds, the time interval between the moment the children of Hiroshima pointed to the B-29 in the blue sky and the moment a blinding flash of light melted their eyes and erased their world. Or perhaps the 100 seconds that the *Bulletin* designates as the window of time that now separates us from worldwide catastrophe.

►► Notes are available at source's URL.

Elaine Scarry is the author of Thermonuclear Monarchy: Choosing between Democracy and Doom and The Body in Pain: the Making and Unmaking of the World. She is Cabot Professor of Aesthetics at Harvard University.

It's been 75 years since Hiroshima, yet the threat of nuclear war persists

By Jack L. Rozdilsky

Source: <https://theconversation.com/its-been-75-years-since-hiroshima-yet-the-threat-of-nuclear-war-persists-144030>

Aug 06 – It is important to mark the solemn 75th anniversary of the first and only use of atomic weapons against cities as not only a remembrance of a tragic past event, but as a reminder of an ever-present threat that we have failed to address.

According to the [Bulletin of the Atomic Scientists](#), civilization-ending nuclear war — whether started by design, blunder or miscommunication — is at the highest risk of realization since 1945, as [the Doomsday Clock is at 100 seconds to midnight](#).



As a professor of disaster and emergency management who has spent time at [the site of the first atomic blast](#) and subsequently studied civil defence preparedness for survival during nuclear war, the 75th anniversary of the bombing of Hiroshima and Nagasaki comes at an especially depressing time.

A replica of the atomic bomb known as Fat Man, which was dropped on Nagasaki, Japan on Aug. 9, 1945. (Jack Rozdilsky), Author provided

At the current moment, we as a civilization are at a low point in our failure to reduce the risk of nuclear weapon attacks. The risks of uninformed decision-making, mishaps or seemingly rational but flawed choices made under pressure can lead nations down a rapid one-way path of nuclear

destruction that we can never fully prepare for.

Weapons of mass destruction

The world forever changed on July 16, 1945, when the first atomic bomb was detonated at the [Trinity Test site in the New Mexico desert](#). The early morning blast was the capstone of an experiment that represented the potential of scientific achievement.

Twenty-one days after the successful test blast, the decisions made to quickly use this new bomb as an unparalleled weapon represented the capability of humankind to inflict suffering onto others. As with many acts of warfare, the use of the bomb was a purposeful creation of a disaster: [a weapon of mass destruction](#).

For 2020, the status of world nuclear forces, provided by the Federation of American Scientists, indicates that [nine nations hold 13,410 nuclear warheads, with what is thought to be 1,800 nuclear weapons on high alert for immediate use](#).

These weapons lurk in the background, and sometimes they make headlines. In 2017, threats of nuclear war were in the news again as tensions mounted when [North Korea was developing its own nuclear weapons](#).

The situation was further aggravated when U.S. President Donald Trump's words threatening nuclear war were [shockingly juvenile and frightening in tone](#).



Civil defence

Protecting the public requires the emergency management and homeland security branches of governments to [develop civil defence plans](#). An example of Cold War-era Canadian civil defence efforts is the late 1960s [11 Steps to Survival](#) guide. [Civil defence from nuclear attack is fraught with difficulty](#), and perhaps among the most complex actions that an emergency manager will ever need to engage in.

If a nuclear attack with a prior warning were to take place, providing pertinent information to the populace about the imminent threat, having shelter-in-place or evacuation options available, having plans appropriately tailored to a given community's needs and being able to convey the risks without creating unnecessary alarm are all needed civil defence actions.

In 1986, former Federal Emergency Management Agency (FEMA) planning specialist Wayne Blanchard asked: "[Civil defence measures can make a difference of tens of millions of lives saved in a nuclear attack. How, then, does one reconcile this with the fact that as of 1984, the U.S. has only a rudimentary civil defence system?](#)"

Today's civil defence efforts remain rudimentary in comparison to the threat. A more recent FEMA fact sheet, from 2018, entitled "[Be Prepared for a Nuclear Explosion](#)" raises more unanswerable questions.

In the 1950s, the United States Federal Civil Defense Administration produced a public information campaign with atomic bomb survival advice should a weapon of mass destruction attack occur. One of the products was the 1951 film, *Duck and Cover*, [which was designed to teach safety measures to schoolchildren](#). Public information strategies have come a lot further since then; a recent campaign from Ventura County, Calif., informs residents to "[Get inside. Stay inside. Stay tuned.](#)"

A 1951 film from the U.S. Federal Civil Defense Administration starring Bert the Turtle demonstrating "duck and cover."

Outpaced preparedness

While any preparedness is better than none, preparedness plans are futile for those in proximity to an atomic blast. We also know from Hiroshima and Nagasaki about the serious [long-term health impacts from radiation exposure](#).

Managing the countless long-term social and economic consequences would require years of work by our best and brightest, assuming they were not already killed by the initial explosion or its after effects.

Nuclear weapons development has effectively outpaced preparedness efforts. Civil defence actions, while meaningful in their own right, are ultimately of little utility in reducing the risks realized in nuclear explosions. Any recurring Hiroshima-like atomic bombings elsewhere would be bleak; mass death would prevail.

On this 75th anniversary of the atomic bombing of Hiroshima and Nagasaki, it remains a disappointment that the threat of nuclear weapons remains. Our only way out of this problem is to work towards abolishing them.

Jack L. Rozdilsky is a Professor at York University who receives funding from the Canadian Institutes of Health Research as a co-investigator on a project supported under operating grant Canadian 2019 Novel Coronavirus (COVID-19) Rapid Research Funding.

Nuclear Security IndexEvent – 2020 Nuclear Security Index

Source: <https://www.nti.org/about/projects/nti-index/>

July 22 – The Nuclear Threat Initiative-Nuclear Security Index is recognized globally as the premiere resource for tracking nuclear security progress. The NTI Index assesses the security of some of the deadliest materials in the world—highly enriched uranium and plutonium—against theft and the security of nuclear facilities against sabotage. For the first time, the 2020 NTI Index is accompanied by a separate Radioactive Source Security Assessment that assesses national policies, commitments, and actions to secure radioactive sources and prevent a dirty bomb.

Wearable Tech Enabling Immediate Identification of Hazardous Materials

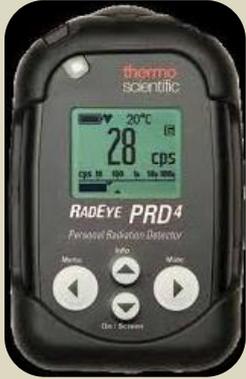
Source: <https://i-hls.com/archives/103230>

Aug 07 – A new solution will save first responders valuable time. Public safety professionals are often the first ones on the scene of an emergency where potentially hazardous materials are present. First responders operating in the chemical, biological, radiological, nuclear, and explosives (CBRNE) arenas are required to assess a scene quickly and take action to determine if harmful elements, such as radiation, are present.

To address this critical need, new wearable, compact technology will significantly enhance the ability to detect harmful levels of radiation, providing first responders, CBRNE responders



and military personnel with the ability to quickly and accurately make informed decisions regarding safety at the scene of operation.



Thermo Fisher Scientific upgraded its **Thermo Scientific RadEye PRD4/PRD-ER4** personal radiation detector. The combination of sensitive Cesium Iodide (CsI) detectors and Natural Background Rejection (NBR) in a single instrument reduces nuisance alarms, improves detection response times, increases reach back data quality and minimizes time spent on non-threat events.

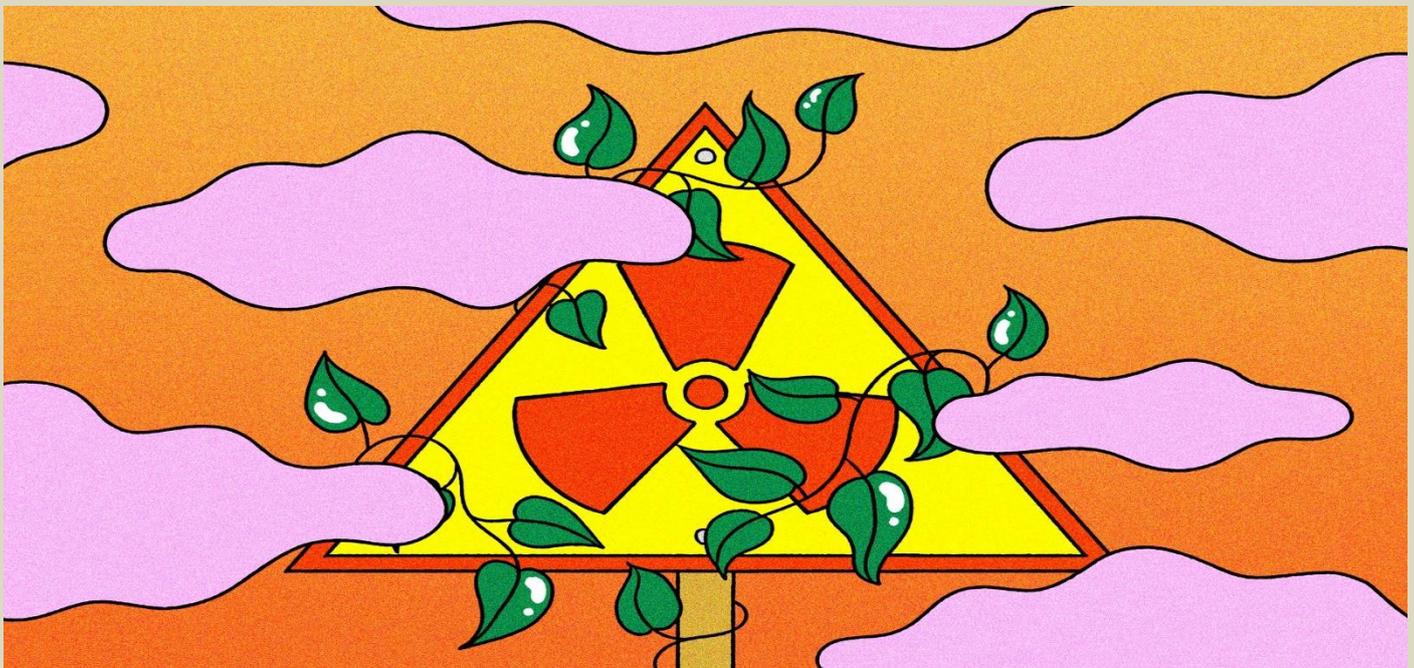
The ability to quickly and accurately assess a situation allows for more effective situational awareness, and prevents others from being put in harm's way. The new system is an essential upgrade to the RadEye suite of personal radiation detectors. Its easy-to-use form factor makes it a go-to resource for professionals regardless of skill level.

The system can be easily calibrated in the field, enabling users to optimize the instruments based on their current environment. This mitigates downtime and the requirement for extra stock to accommodate costly turn-in and replacement. The instrument features a simple user interface and large screen.

Forest Fires Are Setting Chernobyl's Radiation Free

By Jane Braxton Little

Source: <https://www.theatlantic.com/science/archive/2020/08/chernobyl-fires/615067/>



Melanie Lambrick

Aug 10 – In the clear, calm, early hours of May 15, 2003, three miles west of the hulking ruins of the Chernobyl Nuclear Power Plant, Vasyl Yoschenko was bustling around a stand of Scotch pines planted 30 years earlier. The trees were spindly and closely spaced, but he was skinny enough to move easily among them, taking samples of biomass and litter. Just beyond the trees, he tinkered with the horizontal plates he had placed on the ground in a diagonal grid and covered with superfine cloth designed to absorb whatever came their way.

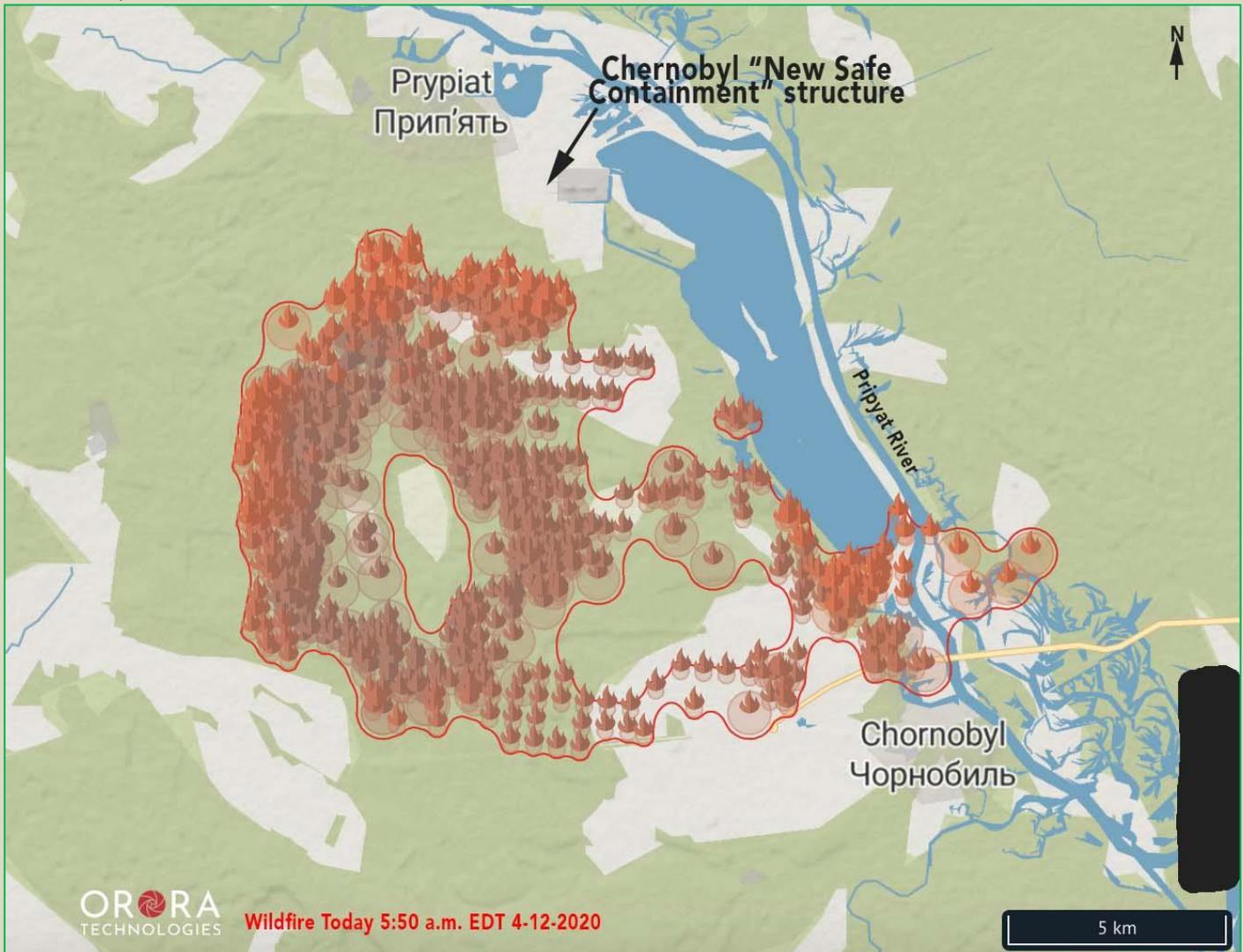
Yoschenko had just finished adjusting his monitoring equipment in the mid-afternoon when the first gusts of smoke billowed from the far side of the pines. Firefighters were torching the edges of an area the approximate size and shape of a football field. Wearing respirators, camouflage pants, and khaki shirts, cloth bandannas covering their heads, the men were systematically setting the woods ablaze. Flames leapt five feet up trunks, racing to the tops of some trees and sending plumes of smoke aloft.

Yoschenko, a Ukrainian radioecologist, had planned the controlled burn to study how radioactive particulates would behave in a fire, and he knew about the risks represented by the nuclear contamination swirling overhead. He prudently scooted to the edge of the forest, donned a gas mask, and began taking photographs. Was it dangerous? Yoschenko shrugs: "Not so much. We were lucky the wind didn't change direction."



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The forest burned intensely for 90 minutes, releasing cesium-137, strontium-90, and plutonium-238, -239, and -240 in blasts of smoke and heat. In just one hour, the firefighters—and Yoschenko—could have been exposed to more than triple the annual radiation limit for Chernobyl's nuclear workers.



“That was crazy,” says Sergiy Zibtsev, a forestry professor at the National University of Life and Environmental Sciences of Ukraine. “That place was really contaminated. Yoschenko risked his life to provide new science—just like Marie Curie.”

Yoschenko’s scientific blaze was a preview of Chernobyl’s future. Since then, the area’s climate has warmed and dried, and its wildfires—most sparked by arson and other human activity—have grown larger and more frequent. Each fire releases radionuclides, just as Yoschenko and his colleagues documented in 2003; each one raises anxieties in Kyiv, the Ukrainian capital, and in Europe’s major cities. But none has incinerated the landscape at the scale of the fires that burned this past April. They were far larger than any since the 1986 disaster, burning for weeks and scorching nearly 165,600 acres before rain finally doused them.

Monitors in Norway, 2,000 miles away, detected increased levels of cesium in the atmosphere. Kyiv was smothered in smoke. Press reports estimated that the level of radiation near the fires was 16 times higher than normal, but we may never know how much was actually released: Yoschenko, Zibtsev, and others impatient to take on-the-ground measurements were confined to their homes by the coronavirus pandemic. August is typically the worst month of the Chernobyl fire season, and this year, public anxiety is mounting. The devastation left by the world’s worst nuclear disaster is colliding with the disaster of climate change, and the consequences reach far and deep.

The Chernobyl Exclusion Zone is a rich mosaic of forests, grasslands, and bogs stretching 1,000 square miles across northern Ukraine. When I visited in 2013, I was shocked, like so many other visitors, by the abandoned family farmhouses with branches growing out of their empty windows, by painted silhouettes of children dancing on the walls of a community center in the hastily evacuated city of Prip'yat, still haunted by their absence. But I also saw



grasslands dotted with young pines, the wind wafting tawny heads of grains gone wild, and a white-tailed eagle soaring over the power plant cooling pond. In a grove of native birch trees, I stood in the morning light as it burnished the leaves against luminous white trunks. I was enchanted—until my dosimeter began chattering. Had I lingered there for an hour, I later realized, I would have been exposed to radiation levels 100 times beyond what's considered safe for humans.

From Hiroshima, Chernobyl, and Fukushima, we are learning about the ghastly, lingering effects of radiation on human bodies. From the uninhabited landscapes of Chernobyl, we are learning how ecosystems react to—and recover from—the same invisible insult. In the chaos after the April 26, 1986, disaster, Soviet officials worked frantically to contain the radiation spewing from the nuclear power plant's No. 4 reactor. To protect public health, they evacuated an area nearly the size of Yosemite National Park. Since then, only those with permission are allowed into this exclusion zone, which Ukrainians aptly call the Zone of Alienation. Ukrainian law mandates that nothing—no blackberries, no mushrooms, no radionuclides—leaves the zone until the radiation dissipates, a long-term proposition, given the 24,000-year half-life of plutonium-239.

The unexpected result is an immense, long-term ecological laboratory. Within the exclusion zone, scientists are analyzing everything, including the health of the wolves and moose that have wandered back and the effects of radiation on barn swallows, voles, and the microorganisms that decompose forest litter. Now, as wildfires worsen, scientists are trying to determine how these hard-hit ecosystems will respond to yet another unparalleled disruption.

Chernobyl is not a landscape inclined to burn. The Vladimir Ilyich Lenin Nuclear Power Plant was built on the southwestern edge of the Pripyat Marshes, Europe's largest swamp. For centuries, the watery terrain was all but impenetrable; floods made it impassable for months at a time, and bogs disoriented persistent invaders. The drier areas were forested with birch, aspen, other hardwoods, and some pines. Late in the 19th century, these forests were cleared for intensive agriculture. But even the most enterprising farmers struggled to grow wheat and other crops in the gravelly, sandy soil.

After Ukraine became part of the Soviet Union in 1922, the government returned the land to forests, logging them for fuel to produce glass and vodka. But instead of the natural mix of species, Soviet foresters planted row after evenly spaced row of Scotch pines, creating a giant softwood production area in a highly regulated forest. By the 1950s, these regularly logged pine plantations covered 400 square miles of what is now the Chernobyl Exclusion Zone.

The explosions that wracked the nuclear power plant in 1986 transformed all life in the region, human and otherwise. Thirty-one people died as an immediate effect of the explosions, and as many as 150,000 have since died of radiation exposure in Ukraine alone. Conservative estimates predict that the death toll will grow by another 41,000; other estimates exceed 1 million. And the disaster upended the lives of those who survived: The mandatory evacuation of 350,000 people forced residents of Pripyat to leave their newly built city, farmers to abandon their fields, and loggers to find work elsewhere.

The forest hit hardest by the nuclear blasts was a pine plantation that stood directly in the path of the deadliest debris. Pines are extremely sensitive to radiation, and the trees turned rust-orange before they died; workers nicknamed the plantation the "Red Forest." As part of the effort to contain the radioactive material, they bulldozed it, buried the trees in more than 5 million square yards of topsoil, and covered the area with more than a foot of sand. Then they replanted it with pines. As the new trees grew, radiation in the soil suppressed an enzyme that contributes to the classic single-stem conifer shape, resulting in an expanse of odd-looking, bushy dwarf pines.

The rest of the forests in the exclusion zone were simply abandoned. Management stopped, leaving the heavily industrialized forests to evolve in their own way at their own pace. Pines began creeping into less contaminated farmland. Birches and other native species less sensitive to radiation began colonizing the hotter areas, slowly replacing the Scotch pines so favored by Soviet foresters. Before the explosion of Chernobyl's nuclear reactor, forests covered about 30 percent of the exclusion zone; they now cover about 70 percent.

Less than two months after the disaster, Soviet officials launched a research institution designed to study the effects of irradiation on agriculture and ecology. Renamed the Ukrainian Institute of Agricultural Radiology in 1991 after the breakup of the Soviet Union, much of the information we have about contaminated foods and the dynamics of radionuclides has been developed here. When I arrived in 2012 at the institute, located in a suburb southwest of Kyiv, I was ushered through an imposing rotunda, where loose tiles in the beautifully ornate floor provided a percussive accompaniment as I clicked and clacked across it. Vasyi Yoschenko, then 47, was waiting in a conference room, pacing around a long table and fidgeting with his glasses. He has a thick shock of intensely white hair and a wandering left eye, which give him a slightly reckless look.

In the spring of 1986, Yoschenko was a soldier in the Soviet Army, stationed 60 miles east of Moscow "for protection against the United States, of course," he told me with an ironic grin. When his service ended a month after the disaster, he was excited to return to Kyiv: "It is a beautiful city, especially in spring, so just imagine what I was feeling after two years of military service." Instead, he found an empty city. The only people on the streets were those employed to wash them down. Yoschenko resumed his education, completing a master's degree in 1989 and immediately going to work at the radiology institute. Now armed



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with a doctorate, he carried at the time the unwieldy title of head of the laboratory of radioecological monitoring, mathematical modeling and dosimetry. He simplified it for me: “I study radiation.”

One of the institute’s most important early tasks was to estimate the concentrations of radionuclides in the soil throughout the exclusion zone. In the conference room, Yoschenko pointed to two framed documents covered with polygons of colors ranging from pale green to screaming orange. Made in 1997 and 2000, these are the first maps to chart the deposits of strontium, plutonium, and other radionuclides that rained down during the disaster. With Yoschenko and others, the institute head Valery Kashparov found that two-thirds of some of the contaminants and almost all the plutonium and strontium have been retained in Ukrainian soil. That was a surprise to some scientists, who had assumed that the radionuclides would move quickly into the water table or scatter around the world in the volatile winds generated by the explosions. Instead, as much as 96 percent of radionuclide activity was confined to the top 10 centimeters of soil.

Over the past 30 years, the government has largely succeeded at keeping what’s in Chernobyl in Chernobyl. But the radionuclides aren’t contained by Ukraine’s quixotic law forbidding their movement. They’re contained by functioning ecosystems.

The gases and debris blasted out of the nuclear power plant fell on trees, grasses, other plants, and fungi, coating them with radionuclides; as much as 90 percent of the contamination was captured in the canopies of pines and other conifers. When their needles fell to the ground, they became part of the forest litter, slowly dispersing the radionuclides they carried into the top layer of soil. Within several years, the trees began taking up these radioactive elements; because cesium and strontium are the chemical analogues of potassium and calcium, Yoschenko and his colleagues studied how the unsuspecting trees treated them as nutrients, absorbing them into their roots and moving them into their trunks. Over time, cesium and strontium accumulate in the trees’ needles, which again fall to the ground and become part of the forest litter.

Without trees or other permanent ground cover, Chernobyl’s radionuclides would have been carried out of the zone by wind or water. By sucking up the nuclear leftovers strewn across the landscape, the forests are stabilizing the contamination, helping prevent the spread of radionuclides south to Kyiv and northwest to Europe.

The forests’ astonishing ability to both survive and contain radiation is now threatened by the worsening wildfires, exacerbated by climate change. “Forests are our friend in health, our enemy when they burn,” says Zibtsev, the forestry professor. When Chernobyl’s trees burn, they send their stored radionuclides aloft as inhalable aerosols. Instead of blasting from a single source, as it did in 1986, the contamination now comes from the trees that cover some 660 square miles around the nuclear power plant.

Twenty-five years after the disaster, Zibtsev and others [predicted](#) that if the forests in the exclusion zone were completely consumed by fire, residents in Kyiv would face an increased risk of dying from cancer and government bans would need to be imposed on foods produced as far as 90 miles away. Although such a large and intense fire is currently unlikely, recent fires have been sizable enough to create similar problems. “If Chernobyl forests burn, contaminants will migrate outside the immediate area,” says Zibtsev. “We know that.”

Zibtsev, 59, is lean and lanky, with a heavy gray crew cut that always seems fully grown out. His father, a teacher, spent the summer of 1986 working outdoors, mostly in Kyiv. He developed cataracts that he suspected were caused by his radiation exposure, though they were never officially attributed to it. Two years later Zibtsev, whose doctorate in forest ecology is from Dnipro State University, had an opportunity to do research in the irradiated forests. His parents, afraid for his safety, refused to allow it. “They didn’t think I needed to risk my health over researching the migration of radionuclides in temporary waste-storage sites,” he told me.

His career stopped. “You don’t turn down a good opportunity like this, but I did,” he said. Instead, he mapped contamination in forests 150 miles west of the No. 4 reactor, where, ironically, the random patterns of radiation release deposited radionuclides that exposed him to the danger he was trying to avoid. Another offer to monitor Chernobyl forests came in 1993, and this time Zibtsev took it. He spent the next five summers collecting soil and vegetation samples that were later analyzed for traces of radionuclides. The radiation he found there was higher than it had been in the period immediately following the explosions, a surprising observation until Yoschenko’s 2003 experimental burn explained it: Fires had burned 12,500 acres in 1992, ripping through the crowns of trees and depositing hot ashes across the exclusion zone in the first out-of-control blaze since the disaster.

Zibtsev was on a Fulbright scholarship to Yale University in 2005 when he learned about catastrophic wildland fires in the western United States. “What if that happened here?” he wondered. “More than Ukraine would be affected.” Zibtsev started drumming up international interest in fire and radioactive safety. Not only Chernobyl firefighters but “distant populations” in other countries were at risk, he told an international conference in 2007. He began coordinating projects aimed at improving wildfire-management capacities through the Regional Eastern Europe Fire Monitoring Center, which he established in 2013 under the umbrella of the Global Fire Monitoring Center and the Council of Europe.

In 2015, a rash of fires in Chernobyl brought international attention to their dangers. By that time, the abandoned forests had filled with flammable dead trees, and when farmers just outside the zone set their fields ablaze—a time-honored agricultural practice—the nearby stands quickly caught fire. From April to August, 37,066 acres burned within the exclusion



zone. Zibtsev [and his colleagues later reported](#) that radiation releases in the zone during the fires were nearly 10 times normal levels, and that radiation levels in the forests of Chernobyl and Belarus nearly doubled in 2015.

Alarmed by the potential for fire-borne radiation releases over Europe, international concern focused on the sorry state of the firefighting forces assembled in Chernobyl. In the exclusion zone, firefighters monitor smoke from rickety lookout towers built before the 1986 disaster. Access roads are deteriorating and often blocked by downed trees. Though Zibtsev helped design a system of fuel breaks creating gaps in the vegetation, the large majority have never been built. The situation is worsened by an almost complete lack of coordination among the three agencies with jurisdiction in the exclusion zone. Faced with government instability, economic chaos, and a six-year war with Russia, Zibtsev said, Ukrainian officials do not have the energy, financial resources, or political will to concentrate on fires in Chernobyl.

During my 2012 visit, the firefighter Nikolay Ossienko showed me around the Paryshev Fire Station near the Belarus border, one of seven stations in the exclusion zone. A fleet of well-polished but aging four-by-four fire trucks was parked in a shed next to the wooden building that serves as the station's office. Dominating the compound was an imposing Soviet-built tank, modified with a pointed plow blade. It's used to create fuel breaks by crushing trees and brush—"anything," explained Ossienko, a burly, blue-eyed Ukrainian whose warm smile winked with a missing tooth. Though firefighters like Ossienko maintain their equipment admirably, says Zibtsev, most of their vehicles are at least 20 years old and no longer reliable. During the April fires, many of them broke down, forcing firefighters to evacuate.

In recent years, a U.S. Forest Service project has installed five fire-detection cameras within the exclusion zone, provided protective gear and breathing devices to Chernobyl firefighters, and developed a fire-management plan to coordinate fire-suppression efforts. It's very helpful, Zibtsev said, but it hasn't solved the equipment shortage. In April, camera traps, which the University of South Carolina professor Timothy Mousseau had set up to monitor wildlife, photographed men fighting fire with wet rags. "No shirts, no masks, no gloves, just wandering around in a burning fire trying to tamp it out," he told me.

This April's fires, which scorched 23 percent of the exclusion zone, were the largest burns ever recorded in the area, nearly four and a half times the size of fires in 2015. Flames torched trees less than three miles from the ruined nuclear reactor, which is now enclosed by an arch-shaped steel shroud.

Although the fires expose Chernobyl's firefighters to dangerous levels of radiation, their risks to residents of the region and beyond are so far relatively low. But as Zibtsev pointed out, individual health is a combination of many factors—food, water, quality of life—and any increase in radiation exposure, however small, adds to existing stresses. In his office, as he ticked off various threats to human health, he moved a small box around on the desktop in front of him, closer and closer to the edge. When he got to radiation, it tottered, ready to fall onto his lap. "Too many stressors hasten death," he said.

Fire also imposes one more stress on Chernobyl's ecosystems, a decidedly human wrench thrown into their long recovery from nuclear disaster. Induced by climate change and sparked by human activity, fire here is only slightly more natural than radiation. Persistent and widespread fire may destroy soil organics and radically redistribute the accumulated radionuclides, Yoschenko said, altering soil chemistry. Changes in soil chemistry will alter plants, which in turn will affect the food chain and animals dependent on it. And larger, more intense fires could destroy the forests entirely, obliterating their ability to keep what's in Chernobyl in Chernobyl. "Keeping forests healthy is the main ingredient to preventing the migration of radionuclides outside the zone," Zibtsev told me.

For now, Chernobyl's forests and grasslands are continuing to process cesium, strontium, and other radionuclides. Even the roots of the contorted trees in the Red Forest are taking up radionuclides, holding and stabilizing them in an ecosystem's gift to the humans who created these contaminants. That process promises to continue—at least until the August fire season gets underway.

Jane Braxton Little is a freelance writer based in California's northern Sierra Nevada. Her work has appeared in publications that include Audubon, Discover, EHP, National Geographic, and Scientific American.

Barakah nuclear power plant connects to UAE grid for first time

Source: <https://www.thenational.ae/uae/government/barakah-nuclear-power-plant-connects-to-uae-grid-for-first-time-1.1065538>

Aug 19 – The Barakah nuclear energy plant has secured another major milestone after successfully connecting to the UAE power grid for the first time.

The landmark Abu Dhabi facility – the Arab world's inaugural nuclear power plant – has produced its first megawatt of clean and environment-friendly electricity using nuclear energy.

The notable achievement comes less than three weeks after the plant became operational. During the process, the generator in Unit 1 of the plant was integrated and synchronised with the requirements of the UAE's national electricity transmission grid.

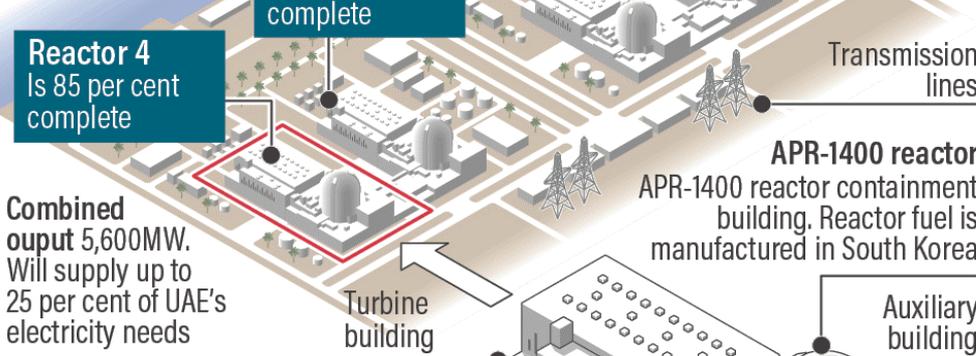


Since the first reactor was switched on at the end of July, operations teams have run a series of tests and steadily increased the power levels in order to produce the first megawatt of baseload electricity.

ARAB WORLD'S FIRST NUCLEAR PLANT

Barakah nuclear energy plant

Four 1,400MW advanced pressurised water reactors built by South Korea's KEPCO



It is a crucial first step in an ambitious journey with an ultimate goal to deliver 25 per cent of the UAE's electricity with zero carbon emissions for several decades.

Mohamed Ibrahim Al Hammadi, chief executive of ENEC, heralded the announcement as the start of a new era for the country.

"The safe and successful connection of Unit 1 to the UAE grid marks the key moment when we begin to deliver on our mission to power the growth of the nation by supplying clean electricity, around the clock," he said.

"Grid connection of Unit 1 really is the beginning of a new era in our project, which is built upon years of preparation and adherence to the highest international safety and quality standards.

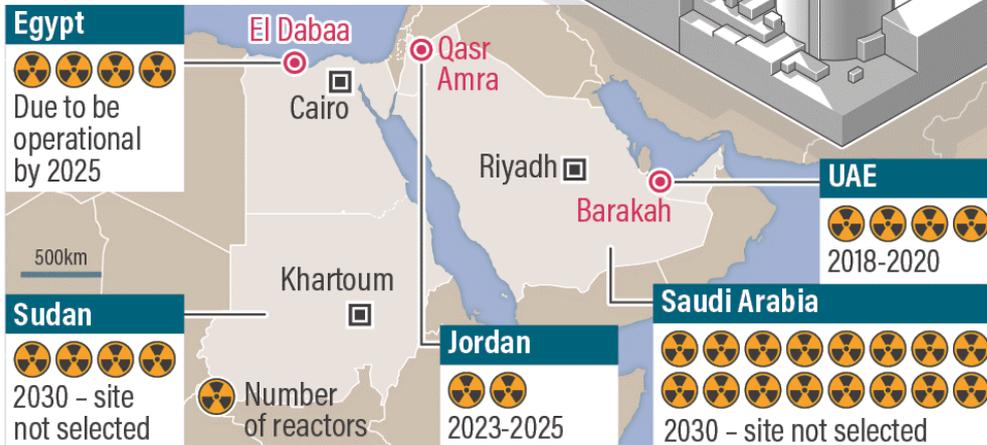
"We are confident in our people and our technology to continue to progress to reach commercial operations, and the completion of the remaining three units, with the goal to power up to 25 per cent of the UAE's electricity needs for at least the next 60 years.

"This project, in addition to the UAE's efforts made in implementing other forms of clean power generation, delivers one of the most ambitious clean electricity transformations in the region and the world, setting the nation on a new track of sustainable development and electrification."

With integration to the grid complete, Unit 1's nuclear operators will gradually increase power levels.

Throughout this stage – known as

Arab states going nuclear



power ascension testing – the team will follow best international practices to ensure the facility is brought towards full capacity in a safe manner.

The testing will be monitored by the UAE's independent nuclear regulator, the Federal Authority for Nuclear Regulation (FANR), which has now conducted more than 280 inspections since the start of Barakah's development.

This is in addition to more than 40 missions and assessments carried out by the International Atomic Energy Agency and the World Association of Nuclear Operators.

This project delivers one of the most ambitious clean electricity transformations in the region and the world

Mohamed Ibrahim Al Hammadi

Mr Al Hammadi lauded the contribution of the Emirati workforce in driving forward the nation's clean energy plans.

"I am especially proud of the talented UAE National engineers and nuclear professionals who contributed to the construction and commissioning of Unit 1, as well as the UAE national



reactor operators and senior reactor operators who have trained for many years across the world and today have the nuclear intellect and know-how to safely manage the plant, to reach the key milestone to power the growth of the UAE with safe, clean and reliable electricity to the UAE grid, working alongside our international experts," he said.

The success was met with praise from FANR.

"Since issuing the operating licence in February for Unit 1 of Barakah nuclear power plant, FANR has continued its regulatory oversight: starting with fuel loading, testing, including the first criticality phase until connecting the unit to the UAE national electricity transmission grid to produce electricity," the authority said in a statement.

Nawah Energy Company, the operator, has met all regulatory requirements to initiate this phase, the authority added.

"The phase is another historic milestone for the UAE Nuclear Energy Programme, which will lead to the full commercial operation of Unit 1 planned later this year," the statement said.

President Sheikh Khalifa led congratulatory messages earlier this month after the plant produced nuclear energy for the first time.

"We are proud of this achievement and confident in the abilities of our young scientists...It is one of the inspiring moments we live today that will be remembered with great pride by generations to come," he said.

Search-and-Rescue K9 Protection in Radiological-Nuclear Environments

By Bryan Musolino and James Michael DeSimone

Source: <https://www.hstoday.us/subject-matter-areas/infrastructure-security/search-and-rescue-k9-protection-in-radiological-nuclear-environments/>

Aug 21 – It's been 24 hours since an unknown entity detonated a nuclear weapon in the Port of Los Angeles. The blast wave blew down structures like dominoes, creating debris and dust that were pulled up into the mushroom cloud creating downwind fallout. The detonation generated a tsunami-like wave that flooded inland and covered parts of the city with radioactive water. The electromagnetic pulse radiated outward from the detonation location and bridged the integrated circuitry of electronics, making most all electronics inoperable to include cell phones. Consequently, those trapped in the collapsed buildings could not call for help and even if they could the dispatchers on the other end are likely either dead or equally trapped. The Federal Emergency Management



Agency's Urban Search and Rescue Task Forces have set up on the outskirts of the disaster area and hazardous material specialists are assessing the radiation levels on scene, while rescue managers are strategizing how to reach the estimated 100,000-plus individuals trapped in and around the collapsed buildings. Time is critical as these victims are succumbing to the blunt-force trauma while others are receiving radiation doses that could quickly accumulate to lethal levels. A quick and fast way to locate trapped or buried people is to use canine assets specifically trained for such work; however, this type of mission poses unique environmental challenges for both handler and canine.

Following the 2011 Japan tsunami, the related Fukushima Daiichi nuclear disaster, and the corresponding international rescue response, questions were raised on whether it is possible to improve the safety of using search-and-rescue canines in a radiological environment. One of the key aspects in these discussions was the exceptional difficulty in determining how to protect the canine when there is no concise or pertinent information available to define protective means and methods. Unfortunately, the lack of concrete data on canine health effects when exposed to low and medium levels of radiation resulted in a lack of a consensus on how to improve the canine's safety. Safe radiation work limits were established for humans through empirical data and other study resulting in a minimum level of increased cancer risk to be at the 0.05, 0.1, and 0.25 Sievert limits.^[1] Yet similar minimum radiation levels have not been established for working dogs, and the few studies that have been accomplished are in strong and opposing debate.^[2] Additionally, individuals who work in a radiation zone can be afforded a certain level of personal protective equipment (PPE), yet the use of such protective equipment can prevent the canine from being able to move properly and perform its designated function. For example, respiratory protection used on a canine would severely inhibit its ability to smell buried victims in a collapsed building. The lack of PPE measures does not negate the importance of protecting canines, especially considering that it can take up to two years and tens of thousands of dollars to train and certify a canine, which results in an exceptionally limited



resource pool. Accepting that a comprehensive study to establish safe canine radiation exposure limits would be extraordinarily difficult to undertake, but acknowledging that the canine assets need to be protected, this essay explores some theoretical options for protecting this key resource for search and rescue.

A radioactive environment can occur several ways, including through the detonation of a radiological dispersion device (RDD), a reactor breach, a nuclear weapon detonation, or just by the placement of a radioactive source. The environment of a radiological disaster can be categorized in one of two ways based on how the material resides in the environment, specifically sealed/contained or loose/uncontained. In an incident with a sealed radioactive source, the material is secured in a vessel or an amalgamate-type material, and emits ionizing radiation. An example of such sources could include density gauges, hospital radio-therapy instruments, industrial X-ray devices, etc. However, if the container is breached or amalgamate broken, until proven otherwise by survey, the event can no longer be considered “sealed/contained” and needs to be classified as unsealed/loose. In this case, material is free moving and can be spread by physical means or atmospheric forces. Such examples would include a nuclear detonation (with related fallout), a nuclear reactor release, a radioactive dispersal device, etc.

In the case of a sealed source, the radioactive source’s emittance is limited to a specific area, which can be easily surveyed and designated as an exclusion zone. Keep in mind that some of these radioactive sources are very powerful, resulting in a potentially large exclusion zone. As the radioactive source is sealed in a container and not mobile, the principal hazard to anyone entering the exclusion zone would be receiving a whole-body exposure of ionizing radiation. In an environment where the radioactive material is loose, it can be expected that there would be multiple exclusion zones of varying radiation levels, with the potential for different isotopes to be present. As the material is loose, constant surveying and exclusion zone adjustments will need to be undertaken. Also, depending on the radioisotope(s) involved, the half-life(s) may be short enough that the exclusion zone will shrink as the materials decays.

Defining the radiation exclusion zones enables a visualization of the hazardous locations; however, this does not preclude work from being accomplished in said zones. If rescuers need to enter the zone then the aspects of time, distance, and shielding need to be considered to lower exposures “as low as reasonably achievable” (ALARA):

- **Time:** The longer an entity is exposed to a radiation level the higher the dose is received, and thus by limiting the time in the exclusion zone the accumulated dose is reduced.
- **Distance:** By the inverse square rule, increasing the distance from a source by a certain factor will decrease the radiation by a squared proportional amount ($I_1/I_2 = D_2^2/D_1^2$ where I_1 is the intensity at D_1 Distance 1 and I_2 is the intensity at D_2 Distance 2). Under this principle, if it is possible to work from an increased distance (or a different incident angle) then the dose will be decreased. For example, if at 5 meters from a source a rescuer were receiving a dose of 5 Sv/hr and moved to a distance of 10 meters then the dose would decrease to 1.25 Sv/hr.
- **Shielding:** Alpha and Beta particles can be shielded with a minimum distance in air, and protection is easily achieved with modern personal protective equipment (PPE). However, photon (gamma, X-ray) and neutron radiation can travel a great distance and will transit through all PPE. To shield against the photons or neutrons, the concept of “half-thickness” can come into play; namely, the thickness of a medium required for half of the incident radiation to undergo an interaction with the material. It may be possible to use existing structure or material at the disaster to help shield the work level and decrease the radiation level being imposed upon the workers/canine.

Although time, distance, and shielding are addressed as individual aspects to lower a radiation exposure, the aspects are far greater when combined and used in a complementary fashion: a canine is worked behind a cement wall, at a different incident angle from the source, and directed only as necessary into zones for quick checks.

Canine Exposure in a Non-Sealed Radiation or Nuclear Source Event

Looking first at an environment that has loose/unsealed radioactive material, there are a multitude of hazard routes that can impact a canine including whole-body exposure, inhalation, ingestion, and even potentially injection of the material. When considering how to protect a canine, the easiest method is simply to exclude them from entering zones with any level of contamination. If it is necessary to place them in areas of radiation then consider using dose limits in the hope of negating health effects, novel use of some PPE, and an adequate decontamination protocol to remove any radioactive material from the animal prior to it entering an uncontaminated zone.

External Dose Hazard

Understanding that there are currently no approved health-related values for canine exposure to radiation the theoretical limits from which work can occur can be established for protective measures. Canines were instrumental in determining the dose effects for humans, and using these studies with the associated LD50, LD5, and related health effects can loosely extrapolate that a 7-18REM, based on a 10-20kg animal, should be the level that



minimally impacts a canine's health (keeping in mind most working dogs are 20-30kg and that the increase mass equates to a decreased affect).^{[1][3][4][5][6][7]} For simplicity, the suggested limit to 5REM annual dose to reflect the same dose levels defined in 29CFR1910 and 10CFR20 for radiation workers will be set. Keep in mind that this is a "whole body" ionizing radiation dose and does not consider hazards from any internal doses. This whole-body dose can then be drilled down further to daily working limits at the disaster scene. As an example, based on a 12-day deployment, 12-hour workday, and a 5REM allotment for the year, the maximum average dose rate the canine should receive is 35 mREM/hr. Thus, with the estimated safe working exposure limit defined, monitoring for this dose rate and corresponding accumulated external dose (internal is addressed later) can be considered.

One of the traditional methods to estimate an exposure is using a photo-luminescence badge as the badges are cheap, reliable, small, and easy to use – which makes for a simple technique to determine a canine's total exposure, but it also requires a reading device that may not be present at the scene, making it impossible to know what dose received was until well after the work event. Additionally, it only captures a total dose for the measured period – it isn't possible to know the dose rate. Another option would be to affix a "radiation pager" that has dose and detection capability to the canine, which would provide a real-time total dose, as well as the dose rate, without the need for a reading device. A secondary benefit from using such a device is that as the canine works in difficult-to-reach areas it will be collecting information for command on the presence and levels of radiation. Regardless of the monitoring technique used, once a canine has reached its operational dose limit it needs to be decided if the canine continues to work or if it is taken from the scene and replaced by a canine that has yet to cumulate any radiation exposure. This is not an easy question as 1) by leaving the canine in the environment to continue to accumulate dose it may result in the canine succumbing to radiation injury, but 2) bringing in a new canine may result in two canines becoming susceptible to radiation health effects (or neither canine having health effects).

Internal Dose Hazard

As a canine explores its environment it does so principally through the sense of smell. Just as in humans, the act of breathing will bring dust and small particles into the respiratory system. This becomes even more pronounced in the canine, especially as canines are working toward a specific scent. Thus, the risk of inhaling radioactive dust is significant. Additionally, a tendency of some canines is to taste areas to help in the exploration of the scent – imparting a threat of ingesting radioactive material. Unlike humans, it is impossible to provide working dogs with respiratory protection, since it will degrade or negate their ability to perform their function of smelling for the target odor (i.e trapped people). Ideally it is desired to know how much material was brought internally into the canine so that work periods and post-event care could be properly addressed. To estimate an internal uptake of radionuclides, the canine would need to be outfitted with a particle collection device across its snout and analyzed post work evolution by scintillation. Obviously, this is not practical due to how it would impact the canine's ability to work, thus there is not a method for accurately determining the quantity of any inhaled or ingested radioactive material. If a canine is subjected to an area with a loose radioactive material it is recommended that an isotopic identification survey is completed to catalog the isotopes that the canine potentially up took internally. This information may be necessary for any follow-on veterinary care, especially if the canine requires chelation therapy.

Of all the potential radioactive isotopes there is one, iodine 131/132, which has a possible means for an internal protection. By administering potassium iodide (KI) prophylactics before exposure to the isotope, the thyroid can be protected (by saturating with iodine and thus blocking further uptake of the radioactive variant). The overall canine health effects of the KI supplement are not known; a risk/benefit decision will need to be made about whether to administer the potassium iodide.^[1] Potassium Iodide prophylaxis at 1.4mg/KG was preliminarily determined to be sufficient for K9s by North Carolina College of Veterinary Medicine Department of Clinical Pharmacy^[1].

The final mechanism that has the potential to introduce a radioactive material to the internal system is injection. As the canine performs its search function it is subject to abrasions, cuts, and punctures – usually minor in nature, but sometimes a major injury may occur. If the item from which the canine received the trauma was contaminated with a radioactive material, then that material can be introduced internally to the canine. In terms of this article, only the radiological effects will be considered and not other impacts due to the chemical nature of the material. In the case of minor cuts and abrasions, the radioactive material will be in close contact to unprotected tissue, potentially leading to localized (but possibly severe) radioactive burns. These types of wounds need to be debrided as soon as possible, with immediate low-level radiological survey post cleaning to ensure that virtually all radiological material is removed. If the canine is to continue to work, the injury area needs to be sealed with an occlusive dressing to prevent any further contamination. Severe injuries that have extensive bleeding will self-debride (to an extent) as a volume of fluids exits the wound. Despite this action, as care is being rendered the wound site needs to be cleaned to remove any latent foreign material. In extreme cases as blood flows through breached arteries or veins it is possible that foreign dust material could be drawn into the bloodstream through a venturi effect. Packing of wounds using pressure dressings or chitosan packings can "theoretically" exacerbate this effect by pushing the radioactive material further into the



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wound and into closer contact to the circulatory system. Loose hemostatic agent may help offset this aspect by sealing those open veins, arteries, and/or capillaries. In the case of puncture wounds or impalements, other than cleaning the outside of the wound site and seeking veterinary care, there is no practical field care.

Ultimately, due to the radiochemical properties and decay paths of nuclides even minute quantities of material introduced internally would lead to significant health problems, including the possibility of death.

Personal Protective Equipment

When considering the nature of a loose radioactive material the primary hazard to a canine is an internal uptake through inhalation or ingestion – for which there are no protective measures that can be offered other than limiting exposure through a system of exclusion zones or limited exposure time. However, there are some measures that should be considered to help protect the canine's whole-body exposure as well as potentially mitigating some of the threat from a source injection. As canines traverse a contaminated area, most of the contamination will occur on the pads (bottom of the feet). As the pads are semi-porous fine tissue to become embedded making the subsequent removal of contamination process difficult. If it is not adequately removed then radiation burns from gamma photons and beta particles could occur as the radioisotope is in close proximity to the tissue. To help prevent such an injury it is suggested that the canine be fitted with close-fitting rubber booties. By protecting the pads in this fashion it will offer a level of protection from the potential of radiation burns, increase the efficiency of the decontamination process, and help decrease the threat of the canine transporting radioactive material into a clean/cold zone. Granted, this will encumber the canine's ability to move through uneven terrain (such as rubble piles), but proper use of the canine in the booties should offset this difficulty (i.e. directing the canine to easier traversed paths).

Beyond the pads and inhalation/ingestion of material, the next threat is a whole-body exposure, which is a threat in all radioactive-laced environments. To provide protection from beta radiation injuries to the torso, as well as to help prevent the potential for injection for radioactive contamination through accidental trauma, it is recommended that the canines be outfitted with close-fitting Kevlar vests. Based on the construction and thickness, the vest will be able to stop all close proximity alpha particles and a vast majority of beta particles before they reach the skin of the canine. Although canine Kevlar vests have not been directly tested against ionizing radiation sources, basic experiments have demonstrated that Kevlar material can provide a level of radiation shielding, thus theoretically lowering the whole-body exposure of the canine (especially when combined with some distancing measures).^[8] Finally, by covering the hair and skin of the canine, the vest will also provide a "contamination barrier" that can be removed during the decontamination process, allowing for a more rapid and thorough decontamination. The vest can create a significant snag hazard, but this can be overcome by re-engineering the vest with tear-away panels or Velcro straps that will quickly release the vest from the canine if it becomes snagged.

Decontamination

If a canine becomes externally contaminated, that radioactive material needs to be safely removed in a systematic and efficient process to mitigate the hazard to the individual while not spreading the hazard in an uncontrolled fashion – by definition, the process of decontamination. Historically it was recommended to use a specifically designed HEPA filter vacuum to remove the radioactive material so to contain the material within the vacuum, but such a process requires specialized equipment and corresponding training and experience. On the flip side of the coin the CDC recommends using a normal water and soap (wet) decontamination process.^[9] However, for anyone who has given a canine a bath, it is easily understood that it becomes especially difficult to keep the water from becoming airborne due to the canine "shaking" itself as that is an innate reflex. Consider that if the radioactive material is contained in the now airborne water droplets, that radiation now becomes an inhalation hazard for the canine and handler. Not to mention that the use of a wet decontamination process can create a significant contaminated waste stream. With these significant issues in the common processes, new technology in decontamination provides opportunities to safely remove a bulk of a radioactive material from a canine while negating these issues. As a canine exits the exclusion zone all PPE (booties, vest) need to be removed, safely bagged, and tagged with the canine's identification for follow on survey for radiation. After being stripped of gear, the canine needs to be surveyed for any radioactive contamination,



with areas two times background or greater being marked.^[§] Special attention needs to be paid to areas that would have high probability of coming in contact with ground materials (legs, underbelly, face). If the area contains significant hair (body), the area should be secured with high-quality medical tape and then shaved with hair clippers – the goal being that the tape will help contain the material in the hair and prevent it from becoming airborne. Next the area is to be wiped in proper fashion using a carbon-based micro-fiber membrane wipe to remove any additional radiation. After being wiped, the area needs to be resurveyed and if necessary additional wipes would be used on the shaved area until the radiation level is below the two times background level. In case of radiation contamination on the face, first the eyes, nose, and the inside of the mouth needs to be carefully flushed, with caution being paid to wash away from the organs. After flushing the hair areas need to be carefully wiped with the carbon-based wipe. Caution needs to be paid not to allow the carbon from entering the eyes or nose as it will severely irritate the membranes. If material has been inhaled and is in the canine's nasal cavity, due to anatomy, it will necessitate immediate flushing by a veterinarian. The ears can be especially challenging due to the anatomy and depth. The only method to readily remove material is by flushing, and it may be desired to seek veterinary care to achieve the cleaning.^[**] In other areas of minimal hair, the carbon-based wipes should be effective if applied directly. In case of pad contamination, it may necessitate soaking the pads in water to dissolve any dirt that might be contain radioactive material.

The last aspect to consider is if the canine has received trauma and the injury site contains a radiological contaminant. There are several general scenarios that should be considered, captured in the following:

- **Life-threatening trauma was received and there is a significant radiological contamination:** Perhaps the worst of the considerations is one where the canine received a significant injury that is life threatening and the level of radiological contamination similarly poses a direct threat to the viability of the canine. In such a case the level of radiation will most likely be lethal to the canine, compounded by the trauma and the canine's systemic response to the trauma. At this junction the safest and most humane action may be euthanasia.
- **Significant trauma with any level of radiological contamination:** Unlike the previous example the trauma is slightly less severe and allows for some minimal time to remove the contamination before the canine succumbs to the injury. As medical interventions are being prepared (discussed above), if there is radioactive material in or near the injury site it needs to be rapidly flushed with a large quantity of 0.9% saline solution to remove as much material as possible via physical action. The injury site needs to be the priority for decontamination so as to not delay medical care (i.e. decontaminate the wound while the bandages are being gathered and opened). Then as care is being rendered the remainder of the canine can be decontaminated with the use of the carbon-based wipes.
- **Minor trauma and any level of radiological contamination:** In this case the decontamination process needs to take precedent over treating the medical issue as the radioisotope poses a far greater risk. If there is radiation in or near the injury site repeated 0.9% saline flushes need to be accomplished to remove the material through physical action. Caution needs to be paid to wash the material away from the injury site, as well as sensitive organs (mouth, nose, eyes, etc.). The carbon-based wipes can simultaneously be used to decontaminate the remainder of the canine.

In all cases, if the canine is sent for definitive care, the veterinarian facility needs to be notified prior to transport so that the facility can properly prepare with appropriate isolation measures prior to arrival.

Canine Exposure in a Sealed Radiation Event

Sealed sources tend to pose a much easier problem to contend in terms of canine exposure. Generally speaking, these sources will be contained to a single location allowing for an exclusion zone to be set at the radiation limit. As the source is contained there shouldn't be an inhalation or ingestion hazard, only the whole-body radiation dose hazard. However, some of these sources can be exceptionally powerful, resulting in a large exclusion zone. Adopting previously mentioned methods of limiting accumulated dose, the canine should only require dosimetry using a radiation pager, limiting the canine's exposure to the source, and possibly a vest to offer some shielding from the source. Decontamination can follow normal methods set for the incident as it should not be possible for the canine to become radioactively contaminated.

Conclusion

The above essay was intended to provide possible options for protecting canines in a radioactive environment, as using a working dog in such a situation should not equate to a death sentence because of preventable radiation exposure. The sheer cost and time required to properly train, certify, and qualify a canine to perform search and rescue results in an exceptionally limited asset and necessitates that these working dogs are preserved. When the risk cannot be eliminated or avoid, the principals of time, distance, and shielding make it feasible to develop appropriate health physics-based plans to achieve these necessary canine preservation measures. Ultimately, the goal should be to safely allow the canine to perform its function in a contaminated environment through the use of appropriate tools and operating protocols.



SIDEBAR

The following section provides additional details on some specific radiation effects that can be imparted on a canine. This is strictly a summary and is only meant to provide some additional detail.

Thermal Radiation

Thermal radiation is composed of electromagnetic radiation in the ultraviolet, visible, infrared, and X-ray regions of the spectrum. When thermal radiation strikes an object, part will be reflected, part will be transmitted, and the rest will be absorbed. Thermal damage and injury are due to the absorption of large amounts of energy within relatively short periods of time. The absorbed thermal radiation raises the temperature of the absorbing surface and resulting in burns.

In addition to the thermal effects of radiation, there is a sub-category of radiation referred to as “ionizing radiation,” where a photon or particle contains enough energy to interact with an atom resulting in the ejection of an electron. In such cases the ejected electron changes the chemical structure of the affected material resulting in the formation of a free radical. Both the free radical and the ejected electron will in turn interact with their immediate neighbors to induce further chemical changes. It’s the combination of all these effects that results in the various radiation injuries.

Radiation Effects on Personnel and Canines

Exposure to high levels of radiation can result in various harmful effects on the living creature through the previously mentioned mechanisms. Depending on where the affected cells reside, damage to the hemopoietic system, gastrointestinal tract, cardiovascular system, and the central nervous system can occur. In considering the possible effects on the body of ionizing radiation, it is necessary to distinguish between acute and chronic exposure. In an acute exposure, the entire radiation dose is received in a short period of time (less than 8 hours) – such as in the initial nuclear blast. Chronic exposure occurs over several days to a lifetime – such as in the case of an individual working near a breached reactor. The importance in distinguishing the two is the effects of a large single dose, versus a period of exposure of a lower dose: an acute exposure to 50 rad can cause changes to the constituents of the blood, but if the same dose was spread over a period of a year, there would be only minor changes to the blood but induce an increased risk of cancer. [\[12\]](#) [\[13\]](#) An acute dose of 600 rad would cause serious illness and potentially be fatal after a few weeks, whereas 600 rad spread over 20 years would have very minor to possibly no effects on the person. [\[14\]](#) [\[15\]](#)

Gamma Radiation Effects

Gamma radiation is highly energetic and is so penetrating that a significant part will pass through the human body without interaction. About 75% of the photons will interact with and lose energy to the atoms of the target tissue. This energy deposition may occur anywhere along a given photon’s path, and therefore, anywhere in the body. If the gamma photon flux is high and the whole body is exposed, a fairly homogeneous deposition of energy will occur. This is in marked contrast to the highly localized energy deposition patterns of alpha and beta radiations. Because of its penetrating ability, the effects of gamma irradiation can be independent of the location of the source. High-energy gamma emitters deposited within the body can result in total body irradiation just as effectively as external sources, if the quantities deposited are large enough and despite the fact that the emitters may not be distributed uniformly throughout the body. [\[16\]](#)

Neutron Radiation Effects

Neutrons are uncharged neutral particles that do not interact with the orbital electrons of atoms as other types of ionizing radiation — instead the particles interact with atomic nuclei directly. Because of their mass and energy, neutrons can cause severe disruptions in atomic structure. This is much more pronounced in very light atoms, particularly hydrogen. Due to their short range, the accelerated nuclei produced by these collisions will expend their energy along short tracks of high excitation and ionization density. In tissue, about 70% to 85% of the entire fast neutron energy is transferred to hydrogen nuclei. The remainder of the neutron energy is dissipated in the nuclei of other atoms. After the neutrons have lost most of their energy through these collisions, the particles will reach an equilibrium energy state at which point they are referred to as thermal neutrons. Slow-moving neutrons have a high probability of being captured by the nuclei of a wide variety of elements such as sodium. Once an atom gains a neutron, the atom in turn become a different elemental isotope and is thus subject to a radioactive decay.

Beta Particle Effects

In simple terms a beta particle is an electron generated through a radioactive decay process. Beta particles will lose most of their energy after penetrating only a few millimeters of tissue. But, if the beta emitting material is on the surface of the skin it will cause a local radiation burn, similar to a superficial thermal burn. If the beta material is incorporated internally, the radiation can cause significant damage. This damage is a function of the number of sources



and how the material is distributed in the body, which is determined by the chemical nature of the radioactive material. Due to the particle size, the density of energy deposited is much less for beta irradiation than that of alpha particles. As a result, the cells impacted by the particle may be damaged rather than killed outright, which may be of greater significance to the total organism than killed cells, particularly if the cells become malignant.[\[17\]](#)

Alpha Particle Effects

An alpha particle consists of two neutrons and two protons emitted in a radioactive decay. These particles are large and slow moving, and thus the energy is fully absorbed within the surface of the skin and can be stopped by a piece of paper. As it can be easily stopped at the surface of the skin, alpha radiation does not pose an external exposure hazard, but if alpha emitting material is internally deposited the radiation energy will be absorbed in a very small volume of tissue. Just like in the beta particle, the energy depositions will kill or damage the cells in the immediate proximity of the source.[\[18\]](#) Although this may seem like a local event that could be overcome by the body's natural defenses, keep in mind the case of the assassination of Alexander Litvinenko using polonium 210 (an alpha emitter).

Incorporation of Radiation into the Human Body

- **Inhalation:** An insoluble material that is inhaled in the form of an aerosol will be deposited along the trachea-bronchial tree. Much of it will be removed by the ciliary action of the mucosa lining most of the respiratory system, but a certain fraction, depending on the size, shape, and density of the particles, could penetrate down to the alveolar air sacs. Material retained can be a considerable hazard to the lung since the material is not easily ejected and will reside in the deposited site. A portion of this material has the potential to be picked up by the lymphatic system that interacts with the various pulmonary regions. If a soluble material is inhaled, it is absorbed very rapidly and completely, and often will not remain in the lungs long enough to cause significant damage. Once in the circulation, it will be distributed in the body based on the chemical properties of the material.
- **Ingestion:** An insoluble material that is ingested will remain in the gastrointestinal tract and eventually be eliminated through normal system actions. However, as the material traverses the tract it will deposit its energy, causing radiation damage. When a soluble material is ingested absorption is quite efficient, allowing the radioisotope to enter the body system and be deposited in locations based on its chemical properties.
- **Transcutaneous Adsorption:** An insoluble material contaminating the intact skin can be an external hazard only if it is a gamma or beta emitter. It will not be absorbed into the bloodstream and thus will not become an internal hazard. If a wound is contaminated, insoluble material will tend to remain localized in the tissue at the wound site, unless removed by debridement. Soluble material will be absorbed readily through wound sites and distributed within the body organs and tissues according to the usual metabolism and chemistry of the stable isotope. Isotopes dissolved in an ionic liquid (water, alcohol, DMSO, etc.) can be readily transported through the surface of the skin.

A radioactive material must be eliminated from the body, by either normally systemic means or medical intervention. Chelating agents, e.g., calcium or zinc DTPA (diethylenetriaminopentaacetic acid), if administered soon after exposure, are effective in enhancing the elimination of certain radioisotopes.[\[19\]](#) These materials are not very effective for radioisotopes that have been incorporated and fixed in organs and tissues. Other isotopes cannot be cleared from the body as rapidly, and there is no adequate treatment available at present for increasing the rate of removal of a mixture of isotopes that would be incorporated into the body as a result of ingesting fallout-contaminated food and water. The uptake by the body of radioisotopes can be blocked in some cases. For example, potassium iodide if given prior to an exposure to iodine 131/132 will block the uptake of radioiodine by the thyroid gland by saturating the thyroid with the iodine from the prophylactic. Similarly, orally administered Prussian Blue will reduce the absorption of cesium and Alginate will reduce strontium absorption from the gastrointestinal tract.[\[20\]](#)

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to 2008 Major Musolino was an all-source intelligence analyst with the National Air and Space Intelligence Center, Future Technologies Division. During this period, he published numerous final intelligence products covering emerging anti-material, energetic material, low-/counter observable technology, and counter satellite/space technology threats. He led efforts for the test and analysis of biological agents being developed in multiple threat countries; resulting in the stand-up of a major laboratory for contingency operations support. Major Musolino holds a Ph.D. in Organic Chemistry from the University of Tennessee, Knoxville.



Captain James Michael DeSimone, USAF, DVM, currently serves as the installation Public Health Officer, Medical Intelligence Officer and subject matter expert for chemical, biological, radiological, and nuclear (CBRN) medical counter measures at Patrick AFB and Cape Canaveral AFS, Florida. He is a Department of Defense certified public health emergency officer. Additionally, Captain DeSimone is a licensed veterinarian in multiple states, practicing preventive, emergency, and critical care medicine and surgery. His most recent work with the U.S Air Force was during a Joint combat deployment, identifying and mitigating chemical/biological attack protective measures for critical infrastructure and military working dogs at Forward Operating Bases in East Africa. Prior to his military service Captain DeSimone has approximately 12 years of experience as a member of several law enforcement and fire/rescue agencies. Serving in multiple roles to include, lead instructor for numerous courses including hazardous materials and working dog medical support. During these years he was a first responder to multiple man made and natural disasters.

▶▶ References are available at source's URL.

Radiation detections in northern Europe: what we do and don't know

By Cheryl Rofer

Source: <https://thebulletin.org/2020/08/radiation-detections-in-northern-europe-what-we-do-and-dont-know/>

Aug 21 – On June 22 and 23, the SEP63 radiation-monitoring station in Sweden detected ruthenium 103, cesium 134, and cesium 137—isotopes associated with nuclear fission—at levels higher than usual, but not harmful for human health. The possible source region in the 72 hours preceding the detection is shown in orange. Two Russian nuclear reactors are located within the suspect region. Credit: Lassina Zerbo/Twitter



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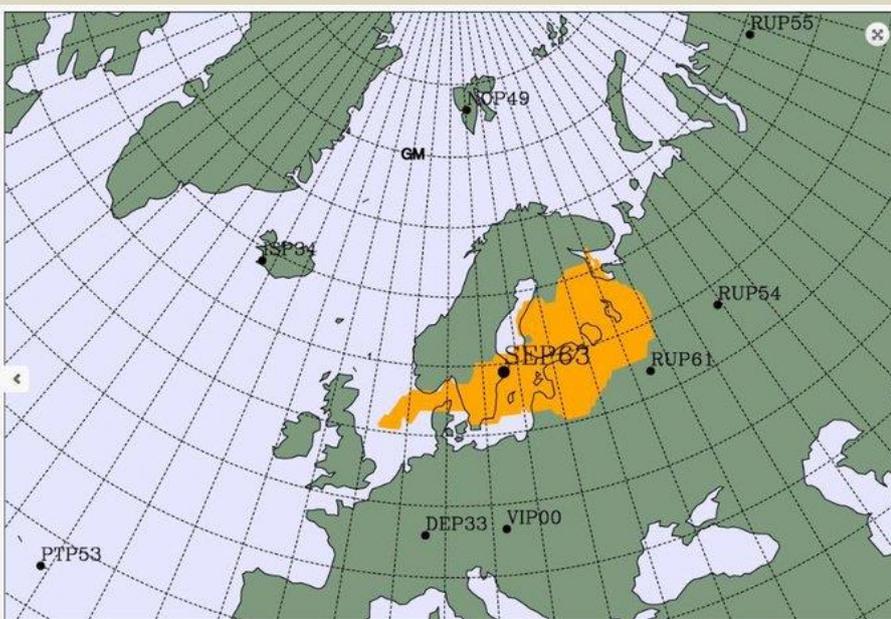
Alarming events may not be what they initially seem. When an enormous explosion created a mushroom cloud over Beirut on August 4, some people immediately jumped to the wrong conclusion, spreading rumors on social media that a nuclear bomb had gone off. It hadn't.

Eventually it became clear that the explosion was caused by chemicals stored improperly in warehouses at Beirut's port. But weapons experts knew from the start that the powerful explosion was not nuclear, because it did not produce a blinding flash of light, or a blast of heat intense enough to set a city on fire. In the hours that followed the explosion, the Comprehensive Test Ban Treaty Organization (CTBTO), which operates a network of monitoring stations around the world, did not detect a telltale spike in atmospheric radiation. That last clue is how experts are able to narrow down the location of nuclear events, from the smallest accidents to major disasters like Chernobyl, and to make educated guesses about what happened. A release of nuclear material spreads its signature on the wind. But that signature is often incomplete or garbled.

Nuclear experts are still puzzling over a mysterious event that happened in June, when several monitoring stations in northern Europe detected extremely small quantities of radionuclides in the atmosphere. That event was not a nuclear weapons test, because the CTBTO stations did not detect any seismic activity. So, what was it? Experts have scrutinized the radiation signature and narrowed down the possibilities. The finger points to Russia.

Radiation alerts

Radioisotope monitoring stations cover most of the globe. The CTBTO runs the [biggest network](#). National radiation safety agencies—



for example, in [Finland](#) and [Sweden](#)—operate other stations. Universities also operate monitoring stations, often in cooperation with the CTBTO or national agencies. Independent monitoring organizations, like the volunteer-driven [Safecast](#), also report radiation measurements.

In early June, Norwegian monitoring stations and a CTBTO station [detected](#) iodine 131 in far northern Norway. On June 16 and 17, Finland's Radiation and Nuclear Safety Authority (STUK) detected cobalt 60, ruthenium 103, cesium 134, and cesium 137 in Helsinki. On June 22 and 23, a CTBTO station in Sweden [detected](#) ruthenium 103, cesium 134, and cesium 137.

Radiation is easy to detect at low levels. The iodine 131 readings were around 1 microbecquerel per cubic meter of air. (A microbecquerel is one atomic disintegration per second in one million cubic meters of air.) But our knowledge of the Chernobyl explosion began with measuring small amounts of radionuclides, so any detection raises an alert.

Interpreting the detections

The types of radionuclides detected also provide information. The radionuclides detected in June, except cobalt 60, are produced by nuclear fission. The half-lives of iodine 131 and ruthenium 103 are 8 days and 39 days, respectively, so they must be from recent fission events. These are common fission products from a nuclear reactor. A wider suite of radionuclides would help to pin down what kind of reactor.

The iodine 131 detection is ambiguous, though. It is produced by fission, but it is also used fairly commonly to treat hyperthyroidism, in pet cats as well as people. It is easily sent into the air. So it may come from sewage plants or other sources. The fact that it showed up without the other fission products means that its source may be something other than a nuclear accident.

Cobalt 60 is not a fission product, but rather an activation product of steel that has been in or very close to a nuclear reactor. It doesn't usually show up with fission products. It could mean that something was broken in the reactor that released the fission products, or it could be that the Finnish reading was in error.

Narrowing down the location

Airborne radionuclides by themselves cannot tell us how or precisely where they were released. The CTBTO [tweeted a map](#) indicating the region in northern Europe where the



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June release may have occurred. This map was probably constructed by tracing the winds during the period just before the radionuclides were detected. A couple of Russian nuclear power plants are located in the area identified, which also covers the location where [the United States believes](#) a Russian experimental reactor exploded last summer while it was being raised from the seabed.

Last month's release was probably a minor incident, like a breach in a filter at a nuclear power plant. But Russia [has said](#) that there were no incidents at its nuclear power plants. The presence of cobalt 60 and the location have led some to suggest that the release may have been from a new attempt to raise that experimental reactor.

It's not possible, with the limited additional data available so far, to do more than guess the origin of the June radionuclides. The source of a similarly ambiguous release of ruthenium 106 in 2017 took two years to identify. In that case, the release of a single fission product suggested a processing facility, and the wind patterns suggested the Mayak facility in Russia. [A detailed study](#) of the stable ruthenium isotopes collected with the ruthenium 106 confirmed those early provisional conclusions.

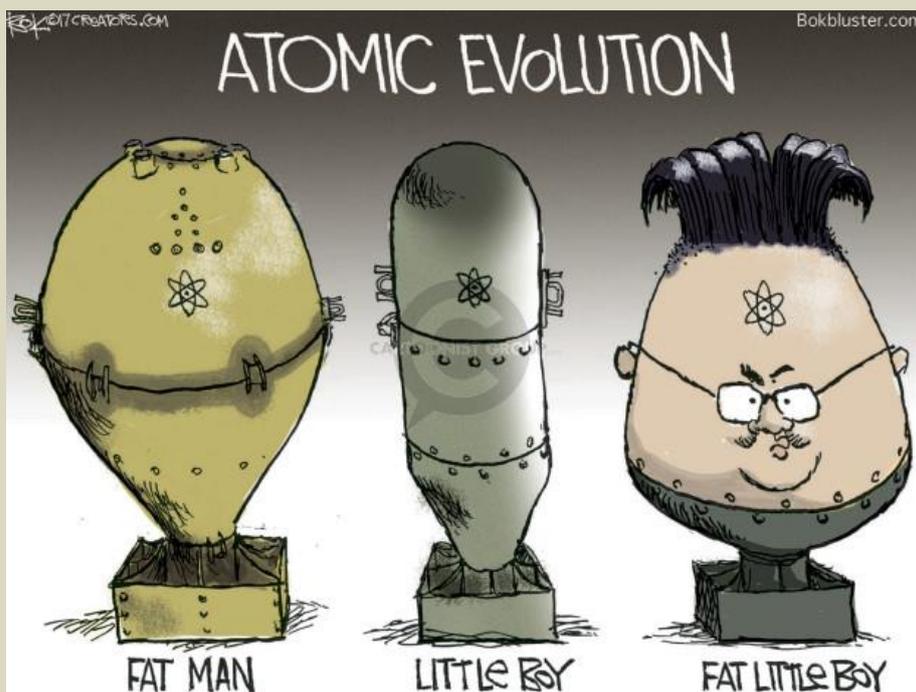
Pinning down the source

[Last year's deadly accident](#) seems to have occurred when a reactor for an experimental nuclear-powered cruise missile was being lifted from the seabed. Again, radionuclide readings from monitoring stations some distance from the source gave early warning to the rest of the world. The amounts and numbers of radionuclides were larger than in the recent release, and reporting on the accident, as people were brought to hospitals, provided more information, including radioisotope detection closer to the site, along with satellite photos and, later, photos of the damaged barge. The radioisotopes indicated that a fission source was involved, although early reports from Russia described an "isotopic source," a phrase usually reserved for single-isotope heat sources, which would be unsuitable for propulsion.

In all three of these cases over the past three years, the radionuclides initially detected by air sampling were ambiguous. Additional information was needed to pin down a source. The best information would come from the country responsible for the release – in all three cases, Russia, which is a signatory to the Convention on Early Notification of a Nuclear Accident.

Somebody knows what happened in these cases. We need to hear from them.

Cheryl Rofer worked at the Los Alamos National Laboratory from 1965 to 2001. She developed an essential spectrum for laser isotope separation, managed environmental cleanups at the laboratory and a program to develop a disposal method for hazardous waste, and worked with Estonia and Kazakhstan to clean up environmental problems left by the Soviet Union. Since retirement, she has been active in local groups having to do with world affairs and Manhattan Project history. She explains scientific aspects of the news on social media. In addition to her technical articles, a book, and multiple interviews, she has reviewed the television series "Manhattan" and the Santa Fe performance of "Dr. Atomic" for Physics Today.



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Preparing State and Local Leaders for an Explosive Attack

Source: <https://www.hstoday.us/subject-matter-areas/infrastructure-security/preparing-state-and-local-leaders-for-an-explosive-attack/>

July 24 – Explosives are a popular choice among terrorists for causing disruption, casualties and destruction. Although chemical, biological, radiological and nuclear (CBRN) weapons may cause much more damage, explosives can still be the first choice because they are relatively easy to make, transport and use. The Department of Homeland Security (DHS) [Science and Technology Directorate](#) (S&T) wants to make sure that state and local leaders have choices, too, by arming them with technology to plan for worst-case scenarios and mitigate the fallout of terrorist attacks.

“Explosives work and are effective weapons,” said Dr. David Reed, a chemist at S&T’s [Chemical Security Analysis Center](#) (CSAC). “The trade-off between difficulty to build and use versus the ability to cause harm is a decision that a terrorist probably considers. On the flip side, a decision-maker like a mayor might ask, ‘What are the most damaging scenarios that can occur and how can I protect against them?’ An analysis that considers the different buildings, explosive types, injuries and medical response can provide the information that begins to answer that question.”

With the very real possibility of explosive attacks in public spaces—like stadiums, special event routes, airports, places of worship, theaters, and others—the U.S. needs to be prepared by having security measures in place to stop them and effective medical response for attacks that do occur. With limited resources, knowing which security measures to use and which medical capabilities to emphasize are critical questions to answer before an attack happens.

S&T’s CSAC is developing a **modeling tool** called **Homeland Explosive Consequence and Threat (HExCAT)** that estimates the hazard and related human health consequences from thousands of plausible scenarios. HExCAT is currently focused on single event assessments of special events such as parades. After validation and further development, it will be integrated into national- and regional-level risk analysis.

“HExCAT is a holistic risk assessment that informs decision-makers like governors and mayors how to invest in security, plan for operations and mitigation, and make important decisions for securing public spaces,” said Reed, who works with CSAC’s Chemical Threat Characterization Team. “If a terrorist were to detonate a bomb in a building vs. a bomb during a marathon vs. a car bomb near a stadium, what physical security and medical countermeasures will be most effective?”

HExCAT is part of a suite of hazard and response models

HExCAT is based on the [Homeland Security Presidential Directive-19](#), which establishes a national policy and requires the development of a national strategy and plan for combatting terrorist use of explosives in the U.S.

This tool is standalone, but it is planned to be part of a suite of models called the Countermeasure Assessment and Planning Tool (CAPT WEB). These models, covering CBRN hazards, help federal agencies analyze threats, vulnerabilities and consequences of potential attacks to prioritize resources for the most effective defense and response. S&T collaborated with the Department of Defense, the Federal Emergency Management Agency, and the Federal Bureau of Investigation, among others, on the development of HExCAT.

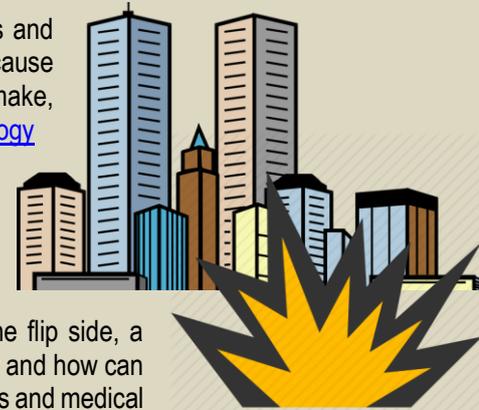
When considering a terrorist attack, thinking of only CBRN leaves out a frequently-used tactic by terrorists.

“The obvious missing piece was explosives—we needed to create something that could easily integrate with the other models and fill in the missing piece,” said Reed. “With the suite of CAPT WEB models, we can compare different types of weapons of mass destruction attacks against each other to prioritize planning decisions. Then with HExCAT specifically, we can assess specific scenarios in terms of consequence, chokepoints in the response, or particular vulnerabilities.”

HExCAT helps cities calculate hazards and medical response

HExCAT maintains a library of 25 different types of military and homemade explosives including combinations of fuels and oxidizers, which increase the effect of the explosion. The tool can also model different scenarios based on a variety of indoor and outdoor public spaces. For general areas, such as city centers or parade routes, HExCAT can simulate city layouts and buildings to model potential damage to representative buildings and determine medical response according to local capabilities.

HExCAT also estimates the human health impact from the simulated explosions and determines the predicted medical response based on local capabilities. A key feature is that its medical mitigation model is fully integrated with the blast effects and injury model. The medical mitigation model can estimate the effectiveness of the medical response using EMT and hospital data (typical equipment, coordinates, trauma center level, number of beds, etc.)



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for both immediate onsite care and hospital-based care, and the logistical weak points connecting the two. While tracking the delivery of medical care in critical time, the model will look for alternative treatments if the preferred treatments are unavailable or exhausted. By capturing the severity of injuries and tracking the personnel, countermeasures and facility resources throughout the simulation, potential chokepoints in the system could be identified and improvements can be made. So, the current ability to respond, both onsite and in the hospital, is captured for every scenario.

“Scenarios can be assessed proactively before major events. The specific locality, staging and location of the event could indicate some explosives and explosive configurations could be more damaging than others,” Reed explained. “We can model the blast, overpressure, thermal and fragmentation effects, as well as building failure and collapse,”



Reed pointed out that the tool could identify particularly impactful scenarios to guide mitigation and security strategies, such as barrier placement, package and person screening, and the medical resources needed if an explosion occurred. All these measures are designed to limit the severity of an attack. Integration with the medical mitigation model allows a clear assessment of the critical onsite and hospital-based medical response. In a real emergency, if victims are seriously wounded, they have very little time. So, the availability of equipment, location of medical response and location of trauma centers is critical. For special events, HExCAT can assist with an assessment of the required resources needed to respond to an attack and provide lifesaving operations in time.

It only takes milliseconds to run a single simulation of a venue, and a full range of variables that characterize a venue can be run in a few minutes.

“A very important difference between HExCAT and more traditional, single scenario, models lies in probabilistic treatment of key variables that define a scenario, including

building and device configuration,” said CSAC Research Scientist Alex Dolan.

Dolan explained that CSAC is not modeling a single explosive or the path of shrapnel but thousands of different explosion scenarios to predict consequences from an event, including variations in building construction, device placement, device enhancements (such as nails or ball bearings), population density, barriers, etc. This way, HExCAT can identify the most damaging sets of conditions that lead to maximum casualties. Focusing on reducing or eliminating these conditions can improve public safety.

It is important to note that HExCAT does not calculate risk. DHS considers a terrorist risk assessment as including a terrorist decision model—the what, how and where they would strike—as well as potential for failure or interdiction by law enforcement at any step in the process. In the future, HExCAT could be integrated with S&T’s [Probabilistic Analysis for National Threats Hazards and Risk](#) program to generate a full risk assessment for explosives.

HExCAT will work with decision makers

Ultimately, HExCAT can help decision makers evaluate the potential severity of an event and the impact of various response and mitigation strategies.

“We can’t know exactly what a terrorist will do, so we need to plan for all of the reasonable possibilities,” said Dolan. “By analyzing the impact from the thousands of possibilities, we can work with officials to identify opportunities to eliminate or minimize the results of an explosive attack.” And this can help save more lives.

CSAC is very interested in working with local planners to validate the model and evaluate its capabilities for modeling specific localities and/or events.

“We are looking for actual explosive cases to see how the model compares to reality and adjust the model as needed to better reflect reality,” said Reed. “Once validated, decision makers like mayors or police chiefs could ask CSAC to run HExCAT and adjust it for their specific cities’ first response and medical response capabilities depending on various aspects like medical infrastructure and transportation systems. They could also ask to modify the parameters of scenarios to simulate the effects of additional hazards.”

After the validation, CSAC will finalize the medical mitigation component and integrate HExCAT into the CAPT platform. Future plans include adding advanced analytics to allow tracking medical resource use, time resolution for scenarios, and refinement of device and material characteristics. HExCAT is expected to be available for use mid-2021.



Hamad International Airport's new technology allows electronic items to stay in baggage during screening

Source: <https://www.business traveller.com/business-travel/2020/07/27/hamad-international-airports-new-technology-allows-electronic-items-to-stay-in-baggage-during-screening/>



July 27 – Hamad International Airport (HIA) will install new airport security screening technology that allows transfer passengers to keep electronic devices such as laptops, tablets, and digital cameras in their hand luggage while going through security checkpoints. The airport says the new technology also allows security personnel to **“easily detect explosive materials held in complex items and structures”**.

Qatar’s airport will initially implement the new C2 technology across all transfer screening checkpoints after the gradual reopening of transfer gates.

Once passengers place their bag on the X-ray machine for screening, it can then be collected without any further stops for re-screening or physical inspections.

The new system also reduces possible cross-contamination among passenger carry-on bags, says the airport.

“The security process at HIA is continuously improving through the introduction of cutting-edge technologies. Our goal is to make the travel journey safer, given the current Covid-19 pandemic. During these challenging times, our priority remains to protect passengers while preserving security. Through the implementation of C2 technology, we can accomplish a more efficient protocol that addresses all passenger concerns. Our passenger-centric strategy helps us continue our investments towards that front while developing solutions that are in the best interest of our people,” said Saeed Yousef Al-Sulaiti, vice president – security at Hamad International Airport.

Qatar’s international airport says it is also looking into adopting body scanners that could “prove to be helpful in the Covid-19 climate as it helps reduce contact during body searches”. Other technologies the airport says it is exploring includes anti-bacterial trays at checkpoints, and UV emitting modules that will automatically disinfect the trays passengers touch.



Port of Beirut Explosion kills 73, injures 3,700

Source: <http://www.homelandsecuritynewswire.com/dr20200804-port-of-beirut-explosion-kills-73-injures-3-700>

Aug 04 – A massive explosion late afternoon Tuesday at the warehouse section of the port of Beirut, Lebanon, killed more 73 and injured nearly 4,000, flattening buildings, shattering glass, and spreading fire.

The official presidential residence and the home of former prime minister Rafik Hariri were slightly damaged by the explosion. The number of dead and injured is likely to rise, as an untold number of people are still buried under collapsed buildings. Lebanese authorities say that many bodies may never be found because they were likely destroyed by the immense explosion or incinerated in the intense fires which follow.



The head of the Beirut fire department said that this was likely the fate of about two dozen firemen who rushed to deal with the first, and smaller, of the two explosions, but were met with the much larger explosion as they arrived on the scene.

There were explosions. The first, and much smaller one, was at a warehouse storing fireworks. But that explosion triggered the massive explosion next door, in a sprawling warehouse which stored, apparently illegally, **2,750 tons of ammonium nitrate**, a volatile chemical which was downloaded from a commercial ship in 2014. The ship was on its way to Syria, which was under strict embargo at the time because of the civil war which started there in 2011 (for comparison: Timothy McVeigh used 1.8 tons of ammonium nitrate to blow up the Alfred P. Murrah Federal Building in Oklahoma City in 1995).



The chemicals were supposed to be stored at the port only temporarily, then moved to a safer location away from residential areas.

The mayor of Beirut said that the owners of the warehouse, who failed to follow instructions to move the chemicals out, will be held to account.

“It is unacceptable that a cargo of ammonium nitrate, estimated at 2,750 tons, has been stored for six years in a warehouse, without precautionary measures. This is unacceptable and we cannot be silent on this issue,” the Lebanese prime minister said.





Beirut Port Explosion – August 04, 2020



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Initial speculations revolved around a possible Israeli attack on a arms warehouse of Hezbollah, the Iran-backed Shi'a militia, but an attack with so many civilian casualties is not typical of Israel's strategy in what Israel calls the "campaign between wars," that is, the



Prime Minister GR
@PrimeministerGR



On behalf of the Greek people, I want to express my deepest condolences to the people of Lebanon, especially to the families who have suffered losses, and wish a speedy recovery to the wounded. Our thoughts are with you.

Greece stands ready to provide any assistance needed.

10:28 μ.μ. · 4 Aug 2020

low-level retaliatory strikes against Hezbollah, Hamas, Iran, and the Assad regime.

When Israel is engaged in a full-fledged war, it has shown little hesitation in attacking military targets even if such attacks killed many civilians.

Israel has denied any connection to the explosion and offered humanitarian aid to Lebanon. Several Israeli hospitals in northern Israel said they were ready to receive injured Lebanese.

Data collected by the United States Geological Survey shows that the massive explosion in Beirut was so powerful, it created seismic waves equivalent of a magnitude 3.3 earthquake.

The United Nations Interim Force in Lebanon (UNIFIL) said one of its ships docked at the port was damaged in the explosion, leaving a number of its personnel wounded, including some in critical condition.

The port has long been a critical link in the country's supply chain for goods including food and medicine, handling 60 percent of the country's overall imports, according to S&P Global. The silos that were damaged or destroyed store 85 percent of the country's grain, and the authorities said that the wheat that had survived was now inedible.

■ ■ **Latest update (18 Aug):** dead: 178 | Injured: ~6,000 | Homeless: 300,000; 6,000 houses totally damaged | Cost (est.): 10-15 bil USD

EDITOR'S COMMENT: Although many recall ammonium nitrate incidents, the Beirut port case reminds me of a mega explosion that took place in the neighboring Cyprus: On 11 July 2011, at the **Evangelos Florakis Naval Base**, situated at Mari, Lamaca in



Cyprus, a large amount of ammunition and military explosives self-detonated, killing 13 people, including the Commander of the Cypriot Navy, Andreas Ioannides, the base commander and six firefighters. A further 62 people were injured. The explosion was the worst peacetime military accident ever recorded in Cyprus and is ranked as the fifth-largest non-nuclear, human-induced explosion in history, with a yield of approximately 2 to 3.2 kilotons. Of Cyprus' US\$24.66bn economy, the EU estimates that the cost of the explosion to the island could amount to US\$2.83bn, with the cost of the power plant itself coming to US\$992m. Was ammonium nitrate alone responsible for the final outcome? Was it stored together with explosives, fireworks, and fuel without any security measures? Most probably not without military-grade explosives present, although 2.750T equals 13.750 classic US TNT bombs (200lb). Both the white and orange smoke elicited should also be evaluated. Was it sabotage? So many fires and explosions in Iranian infrastructure without a clue on who is behind these actions. Is the flight of three US P-8As the day before the explosion connected? Is the viral IR video with a (new [?] type) missile hitting the silos, fake? Was the warehouse a private or a gov owned establishment? Responsibility goes all the way to the supervising Ministry and the government (not only to the General Manager of the Port). Too many questions to be answered and that in Lebanon might take years to reveal and punished – if ever, especially if Hezbollah is somehow involved! The bottom line is that it is a miracle that Beirut is still standing!

Terrifying Explosion in Beirut Wasn't Nuclear, Experts Say, And Here's Why

Source: <https://www.sciencealert.com/beirut-s-tragic-explosion-is-devastating-in-size-but-nothing-about-it-suggests-nuclear>



Sat image: before (left) and after (right) the explosion – crater at least 75m wide; 43m deep!

Aug 05 – When an [enormous explosion](#) created a mushroom cloud over Beirut, killing dozens of people and injuring thousands more, online commentators and conspiracy theorists quickly jumped to a frightening claim: A nuclear bomb had gone off in Lebanon's capital city.

But as state officials say, and contrary to those fast-spreading rumours, the explosion was almost certainly not caused by a nuclear weapon.

Even before Lebanese officials said the explosion was caused by a large stockpile of ammonium nitrate stored in a warehouse at the port, [according to The Guardian](#), experts who study nuclear weapons quickly and unequivocally rejected the idea that Beirut had been hit with a nuclear bomb.

Key to those rejections are the videos that Beirut residents managed to [record video of the huge detonation](#).

People trained cameras on the Beirut port at the time of the blast because a worrisome cloud of smoke rose beforehand. Some of those videos show small flashes of light and reports (or sounds) that are distinctive to fireworks.



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Moments later, the huge explosion – which came with a visible blast wave and mushroom-like cloud of smoke – rocked the area, destroying nearby buildings and shattering distant windows.

In a tweet that accumulated thousands of likes and reshares before it was deleted, one user wrote: "Good Lord. Lebanese media says it was a fireworks factory. Nope. That's a mushroom cloud. That's atomic."

Vipin Narang, who studies nuclear proliferation and strategy at the Massachusetts Institute of Technology, immediately spiked the claim. "I study nuclear weapons. It is not," Narang [tweeted](#) on Tuesday.

Martin Pfeiffer, a PhD candidate at the University of New Mexico who researches the human history of nuclear weapons, also rejected [assertions](#) on social media that a "nuke" caused the blast. "Obviously not a nuke," Pfeiffer [tweeted](#), saying later: "That's a fire setting off explosives or chemicals."

Pfeiffer indicated that the explosion lacked two hallmarks of a nuclear detonation: a "blinding white flash" and a thermal pulse, or surge of heat, which would otherwise start fires all over the area and severely burn people's skin.

The explosion did trigger a powerful blast wave that apparently shattered windows across Beirut, and it was briefly visible as an expanding, shell-like cloud – something often seen in [historic footage of nuclear detonations](#).

But Pfeiffer noted such blast-wave clouds, known to weapons researchers as a "Wilson Cloud," are made when humid air gets compressed and causes the water in it to condense. In other words: They aren't unique to nuclear bombs.

A back-of-the-envelope calculation [reshared on Twitter](#) by Narang suggests the blast was equivalent to around 240 tons of TNT, or about 10 times as large as the US military's "mother of all bombs" or MOAB is capable of unleashing. By contrast, the "Little Boy" bomb that the [US dropped on Hiroshima](#) in 1945 was about 1,000 times as powerful.

As a counterpoint to suggestions the Beirut explosion was caused by a nuclear weapon, Pfeiffer [offered](#) a [video](#) showing the detonation of a rocket-propelled "Davy Crockett" nuclear weapon, which exploded with a force equivalent to about 20 tons of TNT.

The Davy Crockett was one-tenth as strong as the Beirut explosion, but had a distinctive flash that's missing from Tuesday's blast. No reports suggest there was any [radioactive fallout](#) after the Beirut blast, which would have been quickly detected.

It's not crazy to wonder if a large blast in a populous city might be an [act of nuclear terrorism](#), of course. In fact, it's one of [15 disaster scenarios](#) that the US government has simulated and planned for (to the point it [created scripts for local authorities to use](#) after such an attack).

But in this case, **Beirut's tragedy was not in any way nuclear.**

Explosions in Beirut: the scientific explanations

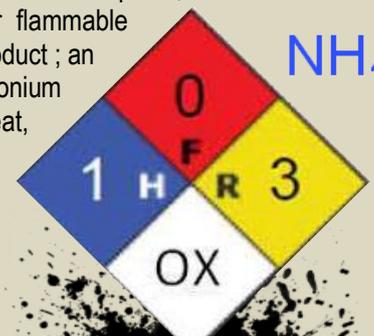
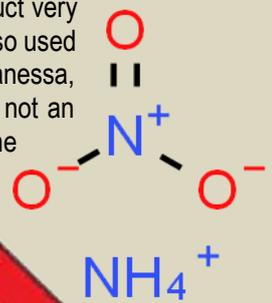
Source: <https://www.indonewyork.com/world/Explosions-in-Beirut-the-scientific-explanations-The-Point-h21513.html>

Aug 05 – The two explosions that hit Beirut on August 4, 2020, killing at least 140 people dead and thousands wounded, are the latest in a long list of disasters involving ammonium nitrate. Widely used to manufacture agricultural fertilizers, it also enters the composition of some explosives, and made part of this title, of the substances monitored by the service's counter-terrorism around the world.

Ammonium nitrate is a chemical compound composed of nitrogen, hydrogen and oxygen, which is in the form of a salt, the **white powder granular**. It is a product very used in fertilizers for agriculture, as it is a source of nitrogen, but it is also used for the manufacture of explosives, sealants, or adhesives," explains Vanessa, an engineer at the prevention unit of the CNRS chemical risk. "This is not an explosive nor a fuel: it is classified as an oxidizing solid. This means that the substance provides oxygen and promotes the combustion of other material", she adds. "In general, three conditions must be met for combustion to take place,

it is what is called **the fire triangle**: fuel or flammable material, such as paper, wood, or a chemical product ; an **oxidizer**, such as oxygen of the air or ammonium nitrate ; and an activation energy, like a flame, heat, spark or static electricity", says the chemist.

"It would appear that there has been a detonation" Before the second explosion in Beirut, the most serious, a fire seems to destroy the warehouses in the port. "The ammonium nitrate, in the presence of a source of heat, may undergo a decomposition in several steps,



nitrate, in the presence of a source of heat, may undergo a decomposition in several steps,

and there may be explosion quickly if the ammonium nitrate is in a confined space," says Vanessa. "The decomposition is difficult to obtain with a pure product, but the presence of incompatible products, such as acids or reducing agents such as greases, oils, heating oil, sugar, sulphur, phosphorus, chlorides, or metals in powder, increases the risk," she says. It is for this reason that the rules of storage, very strict requirements are imposed to this substance. The explosion of the AZF factory in Toulouse in 2001, had probably been caused by non-compliance of these rules, which have been strengthened since. The explosion was unimaginable," "What defines an explosion, that is, in a confined space, the reaction to sudden combustion or decomposition with an increase in either the pressure or the temperature, or both," she continued. "During an explosion, the shock wave propagates at a certain speed: if this speed is supersonic (greater than the speed of sound), then there will be a detonation; if it is subsonic (below the speed of sound), then an explosion will take place", she says. "Here, it would seem that there has been a detonation, the mushroom cloud, characteristic of detonations, though often associated with nuclear explosions," details Vanessa. "ammonium nitrate, when it is used as a source of nitrogen in fertilizer, could be replaced by the ammonium sulfate, or urea, which are coupled to other molecules, according to the experiments of a team of the american university of Missouri dating back to 2006", specifies the scientist.

Protection against Terrorist Attacks with Homemade Explosives

Source: <http://www.homelandsecuritynewswire.com/dr20200804-protection-against-terrorist-attacks-with-homemade-explosives>

Aug 04 – Terrorist attacks often feature the use of homemade explosives. For the police and security forces to be able to take appropriate precautions and assess the damage after an attack, they need access to the right kind of tools. A research team from the Fraunhofer Institute for [High-Speed Dynamics, Ernst-Mach-Institu](#), (EMI), has now developed a sophisticated risk-analysis system to help prevent such attacks. At the same time, the software-based system assists with the forensic investigation of such incidents. It can therefore support the police foil attacks with homemade explosives and protect the public at major gatherings and other events.

In recent years and decades, there have been many terrorist attacks in the EU that have involved the use of homemade explosives. Not only are the materials for such explosives readily available, but the resulting devices – which can differ substantially in construction and size – can be easily deposited almost anywhere. While homemade bombs are a constant threat, the actual risk posed by an explosive device may vary significantly. In order to protect people at major events such as Christmas markets or city marathons, the police need to be able to analyze this risk in advance. On the other hand, when it proves impossible to prevent an attack, forensic experts are called in to assess the level of damage and gather evidence for a future court hearing. Here, it may be necessary to perform a reconstruction of the explosion, which is costly and time-consuming.

A Software Tool to Fight Terrorism

Researchers from Fraunhofer EMI working on the [SUSQRA project](#) have therefore developed a software that analyzes and quantifies the expected damage from a homemade bomb with almost no need for reconstruction. This gives the police a system that helps not only with the prevention of an attack but also with the forensic assessment of the potential damage. The project is funded by the German Federal Ministry of Education and Research (BMBF) and coordinated by VDI Technologiezentrum GmbH. "After a bomb attack, the BKA (the Bundeskriminalamt, Germany's Federal Criminal Police Office) has to perform a reconstruction of the explosion so that the court can determine the appropriate penalty," explains Dr. Katharina Ross, mathematician and research fellow at Fraunhofer EMI. "But with our tool, you can calculate the damage that would be caused by a specific explosive device. This is also useful in the case of bombs that do not actually detonate. We use simulations to generate information on parameters such as the distance traveled by flying shrapnel, the type and amount of explosive, and the type and thickness of the material used to encase the explosive. It is not always possible to dispense with an actual reconstruction of an explosion, which is costly and time-consuming, but our software tool does substantially reduce the requirement for this."

Fraunhofer [notes](#) that the work of the research team focuses on homemade explosive devices. These can vary enormously in type, ranging from repurposed beverage cans to pipe bombs. To evaluate the potential damage of an explosion, it is necessary to determine the impact of the resulting pressure wave and flying shrapnel. As a rule, the thicker the material encasing the device, the heavier and more dangerous are the fragments produced by the explosion. Two of the key factors that affect the scale of damage are the mass of the fragments and their velocity. A unique feature of the software tool is its ability to analyze the behavior of not only rounded but also angular and intricately shaped fragments, about which little research exists.

Test Denotations to Check the Accuracy of Simulation

To assess the degree of danger, a distinction is made between three different types of shrapnel: harmless, liable to cause injury and fatal. The potential damage of an explosion is calculated on the basis of special numerical simulations. This in turn delivers a risk



assessment. “We can calculate which fragments are produced and accurately predict their initial velocity and angle of projection,” Ross explains. “On the basis of this information, we can then develop precise algorithms.” The findings from these numerical simulations are supplemented by actual test explosions performed with a typical homemade explosive corresponding to the one used in the device.

Various Applications for Supporting the Police Work

Not only will the police benefit from this expert tool, but it will also enable event organizers and municipal authorities to review various safety concepts in advance of mass events such as city marathons or large-scale religious gatherings. Based on a range of variables, they can determine, for example, whether and where runners and spectators are safe, as well as factor in the impact of preventive measures or evacuation zones. At the same time, should the attack be foiled by police intelligence, the tool can be used to reconstruct the incident and quantify the damage that would have been caused.

At present, the research team is working to optimize the user interface of the demonstration software on the basis of feedback from project partners (see box). An initial test series with explosive devices of complex geometries has shown that the simulated results are a close match to the actual explosions. Further simulations for the creation of forensic and preventive scenarios are to take place this fall.

Could the Beirut explosion happen in Israel?

Source: <https://www.jpost.com/middle-east/beirut-explosion-puts-spotlight-on-dangers-of-chemicals-at-haifa-port-637544>

Aug 06 – Physical and metaphorical smoke may obscure the picture of Tuesday’s enormous explosion in [Beirut](#) for some time. But the event itself has already riled Israelis about what might happen with chemical facilities and other sensitive infrastructure on the Jewish state’s home front.

“We need to remove the dangerous chemicals from the Haifa Bay,” said Likud MK Gila Gamliel to 103FM. “The plan is to remove the [chemicals] within five years and then [take] another five years to clean the area.”

Blue and White MK Miki Haimovich, chair of the Knesset Internal Affairs and Environment Committee, also stressed that Israel should be “very troubled.” She called to promote a plan to close Haifa’s petrochemical industry, “in the heart of a bay and a population.” Haimovich said she will call a meeting with all relevant authorities to examine the state’s readiness for a disaster such as the one in Beirut, including prevention, risk management and preparedness.

Speaking to The Jerusalem Post on Wednesday, former Israeli deputy National Security Council chief Chuck Freilich said that the threat “is a severe one... this week we got new confirmation from the state comptroller that there is a serious problem.

“It’s clear we are years behind in this field; not enough is being done,” Freilich said, noting that it took around 15 years to move the large ammonia facility in Haifa, which was moved in 2017.

While moving the facility may have been discussed for around 15 years, its move came less than two years after a direct threat from Hezbollah leader Hassan Nasrallah in February 2016 to attack it with rockets to cause a near-nuclear-sized explosion.

The Meir Amit Intelligence and Terrorism Information Center said at the time that [Nasrallah](#)’s threat was likely directed at maintaining deterrence with Israel when much of Hezbollah’s forces were stuck in Syria.

Furthermore, it said that Nasrallah wanted to highlight the power of his forces’ precision missiles, and that he had made similar threats against



Israeli infrastructure dating back to 2012.

However, the intelligence center said that Nasrallah’s insinuation – and exaggeration – that such a strike could cause a nuclear-size explosion succeeded in bringing the issue to the attention of the general Israeli public in an unprecedented way.



Freilich said that, “when people want, things can happen. Maybe the direct threat he made moved the priority” more front and center, but “it was not as if we were not aware of the problem.”

Despite that facility moving, there are still a large number of chemical and other sensitive facilities near Haifa population centers which may not be moved for another five years.

The Haifa Environmental Research Center stated on Wednesday that **there are “1,500 aggregate risk areas and 800 types of dangerous chemicals in the Haifa Bay area, in factories right next to our bedrooms.”**

The Shafir Report for examining risks in Haifa found that “factories and hazardous materials facilities in Haifa will be damaged in an emergency – as a factual determination.”

The former deputy National Security Council chief stated that chemical facilities in Haifa are only the tip of the iceberg of Israel’s problem.

“There are critical facilities all over the country – water, communications – and not all of them have been hardened and we don’t have enough Iron Dome batteries” or Iron Dome interceptors to prevent them from being struck by rockets.

“I’ve been arguing for years that Israel has to bite the financial bullet and invest in a national rocket shield,” he said.

“I am not talking about something totally hermetic,” Freilich said. “I am talking about two things: ending the current situation” where Israel has too few Iron Dome batteries, and having “to choose between defending military institutions, critical infrastructure and the civilian population – this is an intolerable situation.

Freilich continued: “Once we’ve done that, we need to reach a level of defense via Hezbollah like we did with Hamas,” where even if it fires rockets, “life pretty much goes on normally.”

Getting into concrete numbers, he said this could be done with around \$7 billion to \$10 billion in financing, five billion of which the US has already committed to and another two to five billion of which he said, “Israel can afford.”

In other words, Freilich’s message was that “we must decide where to put our defense money. Some into hardening and moving facilities out of population centers, but those are pinpointed defenses. If you want to provide [full] area defense, that is where anti rocket systems come in.”

Elaborating, he said that “you can’t move everything – and Israel’s tiny anyway” – limiting options for moving some facilities. “You can move really big things, like the ammonia facility in Haifa or the Pi Gilot facility” north of Tel Aviv – another move which took more than a decade.

He argued that “you must neutralize the threat, and that isn’t hardening. Hardening is a backup if you have anti-missile defense: the ability to destroy rockets offensively before they can hit or defensively [after they are launched]. And you need both because we do not have sufficient offensive capabilities to stand alone – and defense by itself “isn’t a full answer either.”

Besides the lethal impacts of explosions, Freilich warns in his book, *Israel National Security*, that an attack on power stations around Hadera could “darken significant portions of the country. It would not only damage the civilian population, but how you run a modern economy” – and that Israel is “militarily dependent on civilian electrical power for most of what” it does.

EDITOR’S COMMENT: Remember the strange case with the Iranian [MV Iran Deyanat](#) (August 2008) and its mysterious content that was hijacked by Somali pirates in the Gulf of Aden?

Hezbollah stockpiled chemicals behind Beirut blast in London and Germany

Source: <https://www.jpost.com/middle-east/hezbollah-stockpiled-chemical-behind-beirut-blast-in-london-637578>

Aug 05 – **Hezbollah kept three metric tons of ammonium nitrate, the explosive thought to be behind the mega blast in Beirut this week, in a storehouse in London, until MI5 and the London Metropolitan Police found it in 2015.**

The Lebanese terrorist group also stored hundreds of kilograms of ammonium nitrate in southern Germany, which were uncovered earlier this year.

The Beirut explosion took place at a warehouse that held 2,750 tons of ammonium nitrate that had been confiscated from a ship.

The Iran-backed terrorists kept the explosive in thousands of ice packs in four properties in northwest London, according to a report in *The Telegraph* last year. The ice pack deception tactic was used in Germany, as well.

A source was quoted in *The Telegraph* saying the ammonium nitrate was to be used for “proper organized terrorism” and could have caused “a lot of damage.”

MI5 arrested a man in his 40s for allegedly planning terrorist attacks, but did not find evidence that the terrorists were planning an attack in the UK.

A foreign government reportedly tipped off MI5 to the explosives stockpile. KAN reported that the Mossad gave the UK the information.



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“MI5 worked independently and closely with international partners to disrupt the threat of malign intent from Iran and its proxies in the UK,” an intelligence source told *The Telegraph*.

The Prime Minister’s Office did not respond to a question as to whether Israel helped the UK nab the terrorists.

However, Germany found the Hezbollah explosive stockpiles with help from the Mossad.

The operation and raid on mosques and residents tied to Hezbollah throughout Germany in April came in tandem with a ban on the terrorist group’s activities.

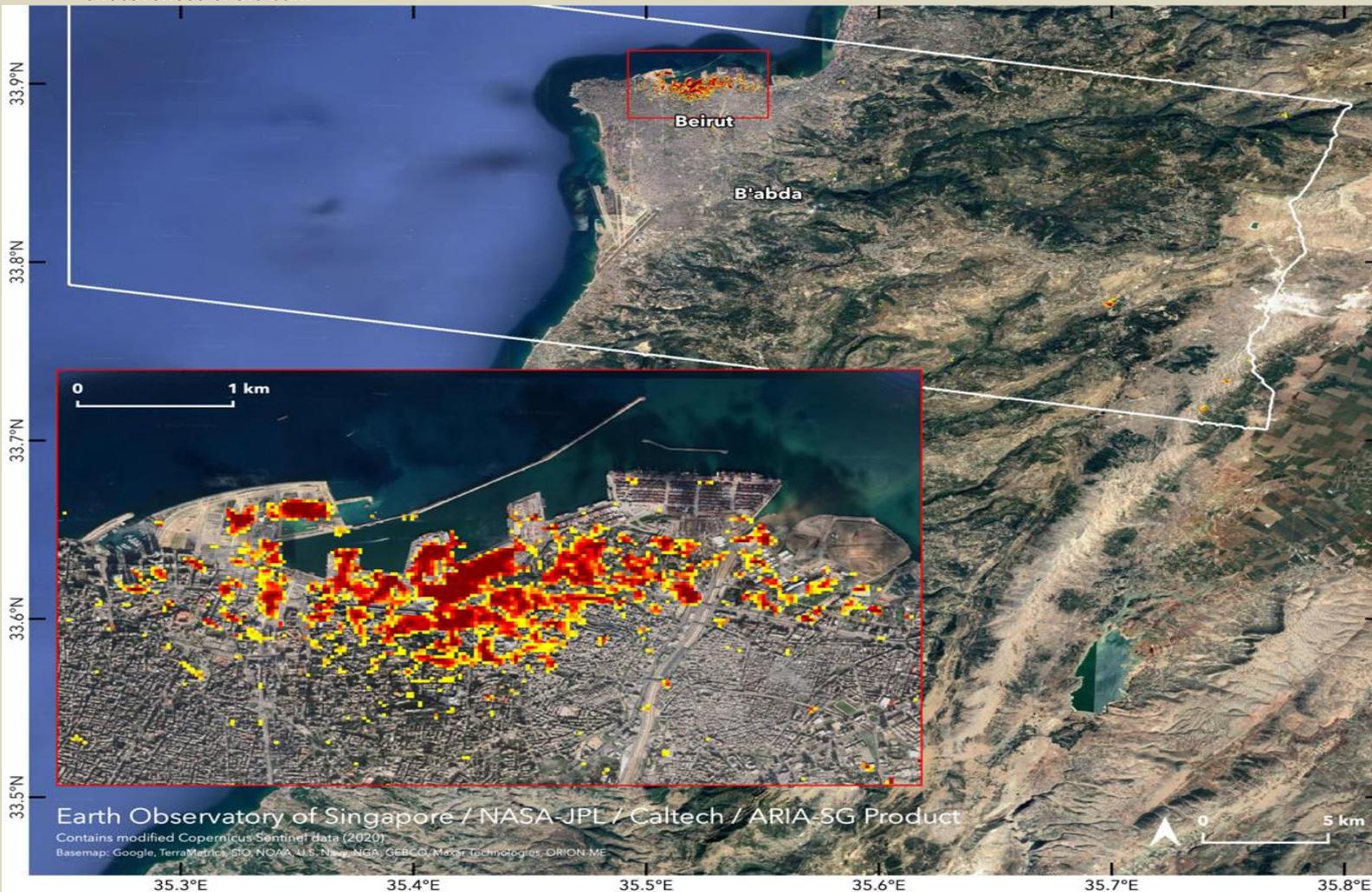
In 2019, the UK banned Hezbollah, making it a criminal offense to support or be a member of the group, carrying a sentence of up to 10 years in prison.

Then-home secretary Savid Javid said the Lebanese terrorist group “is continuing in its attempts to destabilize the fragile situation in the Middle East – and we are no longer able to distinguish between their already-banned military wing and the political party. Because of this, I have taken the decision to proscribe the group in its entirety.”

Last week, a cross-party group of UK parliamentarians expressed concern that the UK was not effectively enforcing the ban on [Hezbollah](#).

The letter sent to UK Security Minister James Brokenshire came after he said, in a Parliamentary answer, that the government did not collect data on the number of people in the UK investigated or charged with supporting Hezbollah.

They called on intelligence agencies and the Home Office to collect and regularly review statistics on people who have displayed the Hezbollah flag or other symbols of support, and update the House of Commons on those numbers, in order to assess the effectiveness of the ban.



NASA’s ARIA team, in collaboration with the Earth Observatory of Singapore, used satellite data to map the extent of likely damage following a massive explosion in Beirut. Dark red pixels represent the most severe damage. Areas in orange are moderately damaged, and areas in yellow are likely to have sustained somewhat less damage. Each colored pixel represents an area of 30 meters (33 yards).



Can Hezbollah Capitalize on Beirut Blast?

By Seth Frantzman

Source: <https://www.meforum.org/61358/can-hezbollah-capitalize-on-beirut-blast>



.....

For Hezbollah, the terrorist army that occupies southern and central Lebanon and maintains an arsenal of 150,000 missiles aimed at Israel, the explosion is a mixed blessing. It could capitalize on the ruination brought to the more liberal parts of Beirut by sinking its fangs into reconstruction efforts.

... This week, the massive explosion represents another possibility for Hezbollah. While it may initially get some criticism and heat for the explosion, because it also maintains dangerous stockpiles of weapons all over Lebanon, it will find a way to leverage this to its benefit. Hezbollah wants China, Russia and Iran to help rebuild Lebanon. Turkey and Qatar are also rebuilding the country, but Hezbollah has amicable relations with Doha.

Hezbollah wants China, Russia and Iran to help rebuild Lebanon.

Now Hezbollah may have to wait some time before making its moves clear. This is because it can't raise its head too much and appear to gloat over the destruction. It will instead try to send volunteers to help and portray itself as the responsible party. It will try to shift blame to Israel and the US. While others are distracted with solidarity for Beirut, Hezbollah will increase its stranglehold elsewhere. This has always been the Hezbollah model. It may increase trafficking in weapons from Syria and construct new bases. ... [T]he explosion becomes a perfect smokescreen and solidarity shield for Hezbollah. For average Lebanese, it is yet another disaster in a long series of disasters.

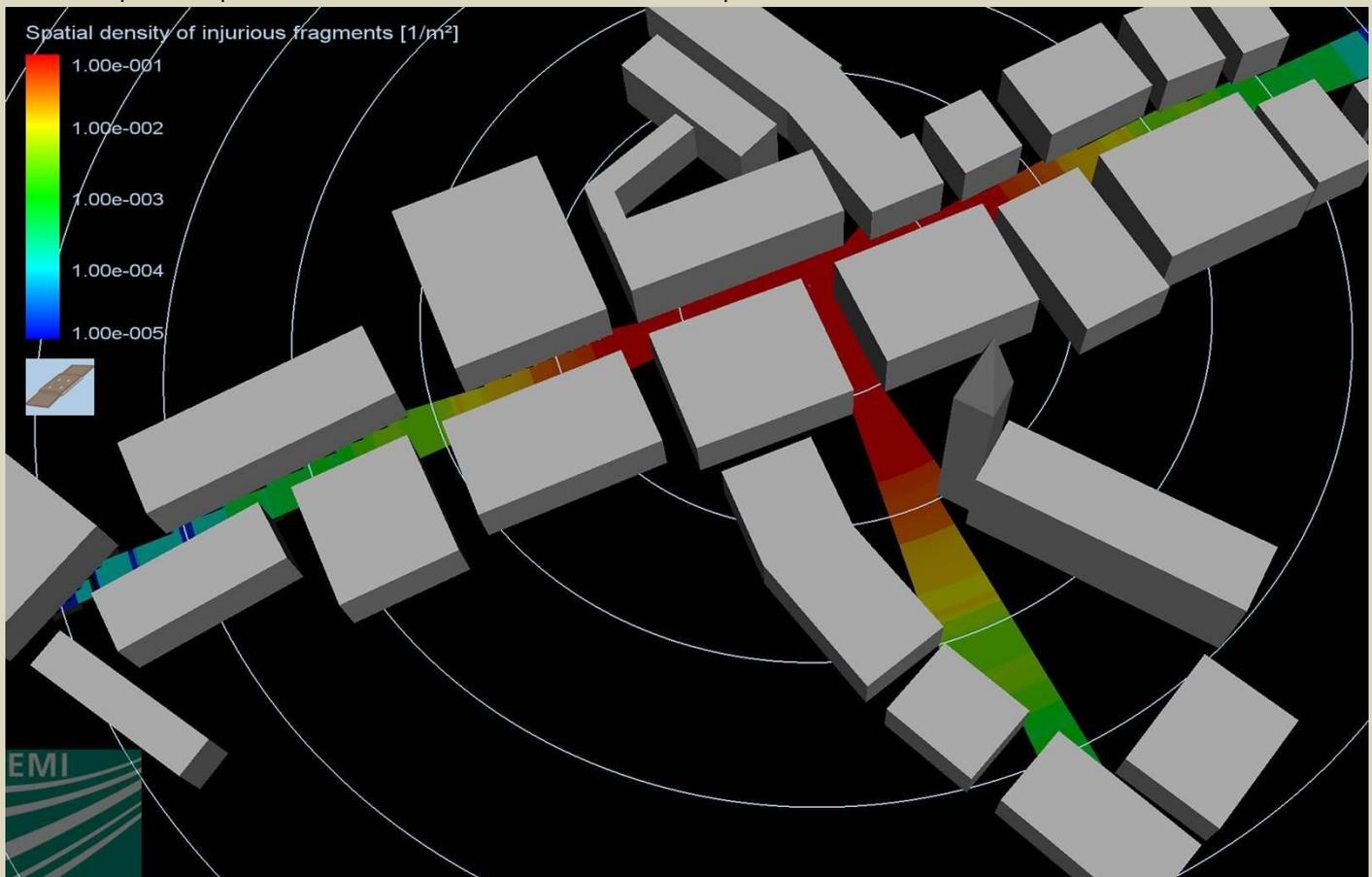
While Hezbollah will pretend to be patriotic, it will work behind the scenes to corrupt everything that comes into Lebanon in the next year.

Seth Frantzman is a Ginsburg-Milstein Writing Fellow at the Middle East Forum and senior Middle East correspondent at The Jerusalem Post.



Protection against terrorist attacks with homemade explosives

Source: <https://techxplore.com/news/2020-08-terrorist-homemade-explosives.html>



Example of a risk-assessment graphic for an urban area. Credit: Fraunhofer EMI

Aug 03 – Terrorist attacks often feature the use of homemade explosives. For the police and security forces to be able to take appropriate precautions and assess the damage after an attack, they need access to the right kind of tools. A research team from the Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut, EMI, has now developed a sophisticated risk-analysis system to help prevent such attacks. At the same time, the software-based system assists with the forensic investigation of such incidents. It can therefore support the police to foil attacks with homemade explosives and protect the public at major gatherings and other events.

In recent years and decades, there have been many [terrorist attacks](#) in the EU that have involved the use of homemade explosives. Not only are the materials for such explosives readily available, but the resulting devices—which can differ substantially in construction and size—can be easily deposited almost anywhere. While homemade bombs are a constant threat, the actual risk posed by an explosive device may vary significantly. In order to protect people at major events such as Christmas markets or city marathons, the police need to be able to analyze this risk in advance. On the other hand, when it proves impossible to prevent an attack, forensic experts are called in to assess the level of damage and gather evidence for a future court hearing. Here, it may be necessary to perform a reconstruction of the explosion, which is costly and time-consuming.

A software tool to fight terrorism

Researchers from Fraunhofer EMI working on the SUSQRA project have therefore developed a software tool that analyzes and quantifies the expected damage from a homemade bomb with almost no need for reconstruction. This gives the police a system that helps not only with the prevention of an attack but also with the forensic assessment of the potential damage. The project is funded by the German Federal Ministry of Education and Research (BMBF) and coordinated by VDI Technologiezentrum GmbH.

"After a bomb attack, the BKA (the Bundeskriminalamt, Germany's Federal Criminal Police Office) has to perform a reconstruction of the explosion so that the court can determine the



appropriate penalty," explains Dr. Katharina Ross, mathematician and research fellow at Fraunhofer EMI. "But with our tool, you can calculate the damage that would be caused by a specific explosive device. This is also useful in the case of bombs that do not actually detonate. We use simulations to generate information on parameters such as the distance traveled by flying shrapnel, the type and amount of explosive, and the type and thickness of the material used to encase the explosive. It is not always possible to dispense with an actual reconstruction of an explosion, which is costly and time-consuming, but our software tool does substantially reduce the requirement for this."

The work of the research team focuses on homemade explosive devices. These can vary enormously in type, ranging from repurposed beverage cans to pipe bombs. To evaluate the potential damage of an explosion, it is necessary to determine the impact of the resulting pressure wave and flying shrapnel. As a rule, the thicker the material encasing the device, the heavier and more dangerous are the fragments produced by the explosion. Two of the key factors that affect the scale of damage are the mass of the fragments and their velocity. A unique feature of the [software tool](#) is its ability to analyze the behavior of not only rounded but also angular and intricately shaped fragments, about which little research exists.

Test denotations to check the accuracy of simulation

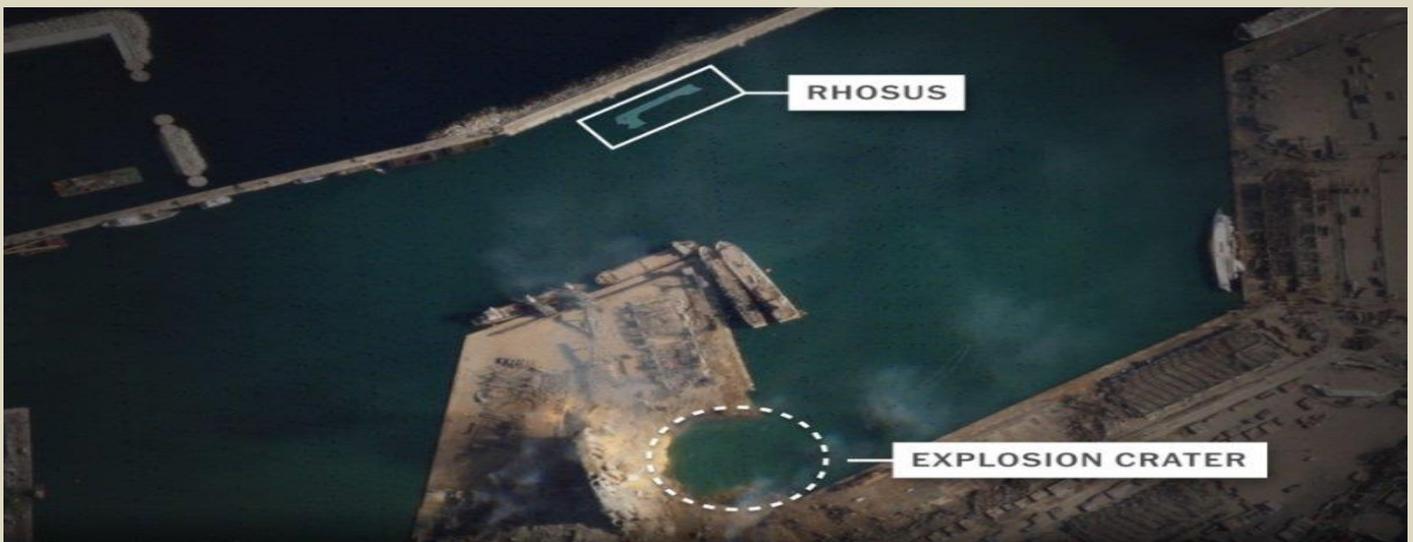
To assess the degree of danger, a distinction is made between three different types of shrapnel: harmless, liable to cause injury and fatal. The potential damage of an explosion is calculated on the basis of special numerical simulations. This in turn delivers a risk assessment. "We can calculate which fragments are produced and accurately predict their initial velocity and angle of projection," Ross explains. "On the basis of this information, we can then develop precise algorithms." The findings from these numerical simulations are supplemented by actual test explosions performed with a typical homemade explosive corresponding to the one used in the device.

Various applications for supporting the police work

Not only will the police benefit from this expert tool, but it will also enable event organizers and municipal authorities to review various safety concepts in advance of mass events such as city marathons or large-scale religious gatherings. Based on a range of variables, they can determine, for example, whether and where runners and spectators are safe, as well as factor in the impact of preventive measures or evacuation zones. At the same time, should the attack be foiled by police intelligence, the tool can be used to reconstruct the incident and quantify the damage that would have been caused.

At present, the research team is working to optimize the user interface of the demonstration software on the basis of feedback from project partners (see box). An initial test series with explosive devices of complex geometries has shown that the simulated results are a close match to the actual explosions. Further simulations for the creation of forensic and preventive scenarios are to take place this fall.

The beginning of the problem



MV Rhosus that initially carried the AN load is sunk in the port since Feb 2018.





MV Rhosus was a general cargo ship that was abandoned in Beirut, Lebanon, after the ship was declared unseaworthy and the charterers lost interest in the cargo. The 2,750 tonnes of ammonium nitrate which the ship was carrying was confiscated and brought to shore in 2014, and later contributed to the 2020 Beirut explosions. The vessel's most recent owner was Cyprus-based Russian businessman Igor Grechushkin. The ship sank in the Port of Beirut, in 2018.

Abandoned Ship: How a Russian Grifter Ignited the Tragedy in Beirut

By Rachel Slade

Source: <https://gregolear.substack.com/p/abandoned-ship-how-a-russian-grifter>

Aug 12 – On August 4, forgotten cargo pulled off a sunken ship blew up half of Beirut. Suddenly, everyone was talking chemicals, oxygen, and explosives. I hadn't thought much about NH_4NO_3 , aka [ammonium nitrate](#), or AM, since [a 2013 "fertilizer factory"](#) explosion destroyed an entire Texas neighborhood and killed at least 15 people. But then I remembered when two white guys with a vague plan to destroy the federal government blew up an Oklahoma City building in 1995 with a truck full of what we quaintly called back then "fertilizer." Maybe those halfwit Robespierres were inspired by the [Texas City disaster](#), when a ship full of the stuff exploded in a port in 1947, igniting nearby vessels also carrying the stuff, killing upwards of 600 people. In short, this is dangerous stuff.

How did AM get to Beirut, and why did it sit in a port warehouse for an astounding seven years before leveling the city? The answer has everything to do with the shipping and mining morass I [previously wrote about at PREVAIL](#).

Before we focus on Beirut, though, let's take a quick trip down the eastern coast of Africa to Mozambique, where that AM was allegedly heading, because the African backstory reveals how tightly we're all yoked together in this tragedy.

Just to get our geographical bearings, Mozambique is a former Portuguese colony on the east coast of Africa, nestled between Tanzania and South Africa, across the Indian Ocean from Madagascar. For more than 500 years, the area served as a major African slave-trade hub, first regionally, then expanded to Asia and the Middle East by Arab merchants. When the Portuguese took over Mozambique in the 16th century, they spent a few hundred years muscling in on the slave trade, evicting Arabs, and digging for gold. By the early 20th century, shrinking Portugal divested, turning



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over control of Mozambique to its own state-supported, free-market capitalists. Three large private companies were allowed to “govern” the African country in exchange for whatever resources they could exploit.

A decade-long revolution led to Mozambique’s official independence in 1975, perfectly timed for the country to become yet another [Cold War proxy](#). Mozambique officially went the Marxist route; capitalists based in the US, [Rhodesia \(Zimbabwe\)](#), and [South Africa](#) propped up a rebel army; bloody civil war ensued for two decades, leaving Mozambique one of the poorest and most undeveloped countries in the world.



Although it was in bad shape, or maybe *because it was* in bad shape, by the 21st century, the country headlined bargain hunters’ lists of countries to exploit. Mozambique was a relatively unexplored pile of dirt with a long coastline, home to some 25 million men, women, and children desperate enough to mine the place to oblivion without asking for much in return.

A [white paper produced by global accounting firm KPMG in 2013](#)—the same year the Beirut-leveling AM was loaded onto a ship in Georgia—reported that “Mozambique is set to benefit from large coal demand from China and India and could well become one of the 10 largest coal exporters globally by 2017.” The only thing holding it back: lack of

proper infrastructure.

The Chinese rushed in to help. In 2018, China was Mozambique’s “largest bilateral creditor at \$2.2 billion,” [according to MacroPolo](#), a University of Chicago think tank dedicated to “decoding China’s economic arrival.” Another major player also came on the scene around 2013: the Brazil-based multinational mining and shipping company, Vale.

In 2012—one year before the AM was loaded on the ship in Georgia—Vale “won” the notorious [Public Eye Award](#), given annually to a corporation whose “business activities have been characterized by human rights violations, environmental destruction, immoral tax practices or corruption.” (Vale had some stiff competition. Glencore won this dubious distinction in 2008.) As of 2018, Vale was the [largest company in Mozambique](#) and coal was the country’s [largest export](#). (Warning: Any readers who share my obsession with mining should not spend a single moment mulling over Trump’s cozy relationship with Brazil’s president, Jair Bolsonaro.)

Almost certainly, the AM warehoused in Lebanon was going to be used for blasting apart Mozambique to get at that coal. The buyer might even have been Vale.

So why didn’t the AM get where it was going?

Blame everything on the anarchic world of international shipping.

Unlike every other industry on Earth, shipping is truly global—meaning it’s inherently complex and difficult to regulate. Blue water shipping is nominally regulated by a division of the UN called the International Maritime Organization, or IMO. All kinds of thoughtful laws emerge from the IMO during its annual conferences; through these laws, participating nations have set emissions, labor, equipment, and safety standards for the global shipping industry.

Individual countries can take or leave those laws. Even the US, a major IMO member, refuses to adopt some environmental standards set by this UN body.

The IMO is a lovely idea. But in practice, it’s only as strong as the entities that enforce it. And on the high seas, that’s kind of a tricky thing. Each country’s coast guard will go after ships once they’re in local waters, but it’s impossible to effectively police the oceans.

Some nations have supported UN efforts to curb piracy off the coast of Somalia, for example, because pirates cut into profits, but generally speaking, [the ocean is a lawless place](#).

Everyone in the industry knows this. The simple solution is to keep your papers in order even as you’re dumping all kinds of crap into the ocean when no one’s looking. Vessels are abandoned on the high seas—with their crews aboard—with alarming frequency when



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owners get bored of paying their employees, coast guard fines, and vessel maintenance costs. When the South Korean shipping giant Hanjin went bankrupt in 2016, it stranded many of its ships, forcing the mariners aboard to [wander the oceans for months](#), shunned by the world's ports. Completely abandoned ships, called ghost ships, can drift for months or years until they crash up on a coast, dumping all their toxic goo as their rotted hulls are ripped apart by the surf. In July headlines, inspectors determined that [an abandoned tanker with one million gallons of oil](#), which has been moored off the Yemeni coast for five years, would likely explode or sink very soon. I wish I could say this was a rare occurrence.



Human rights abuses plague the industry. People from developing countries, especially the Philippines and India, compete for low-paying, months-long, super risky maritime jobs, keeping labor prices rock-bottom. Only the most desperate seamen are willing to crew certain ships. Once a decrepit vessel sails into international waters out of sight of land, the mariners aboard are at the mercy of a faceless company with an often-nameless owner, and an onboard leadership that may or may not be competent or compassionate. Working conditions can be brutal, assigned tasks can be risky, abuse of power can run rampant. Oh, and sometimes, there's no food.

The worst elements of this industry were at play in the story of the *MV Rhosus*, the ship that delivered the ammonium nitrate to Beirut. An undisclosed buyer paid the ["rough and tumble"](#) Russian businessman Igor Grechushkin one million dollars to ship 2,750 tons of AM from Georgia to Mozambique. It's unclear whether Grechushkin had any prior shipping experience, but clearly, that didn't stop him.

All you need to become a shipper is, well, a ship.

To carry out his end of the bargain, Grechushkin apparently used some of his windfall to purchase the *Rhosus*, a 27-year-old cargo ship, from a Cyprus-based company. He employed a fellow Russian, Boris Prokoshev, to helm the ship. The AM was [manufactured in Rustavi, Georgia, by Rustavi Azot](#), a large chemical manufacturer, and loaded onto the *Rhosus*, which then sailed then across the Black Sea, stopping in Istanbul, Turkey; Piraeus, Greece; and finally, Beirut.

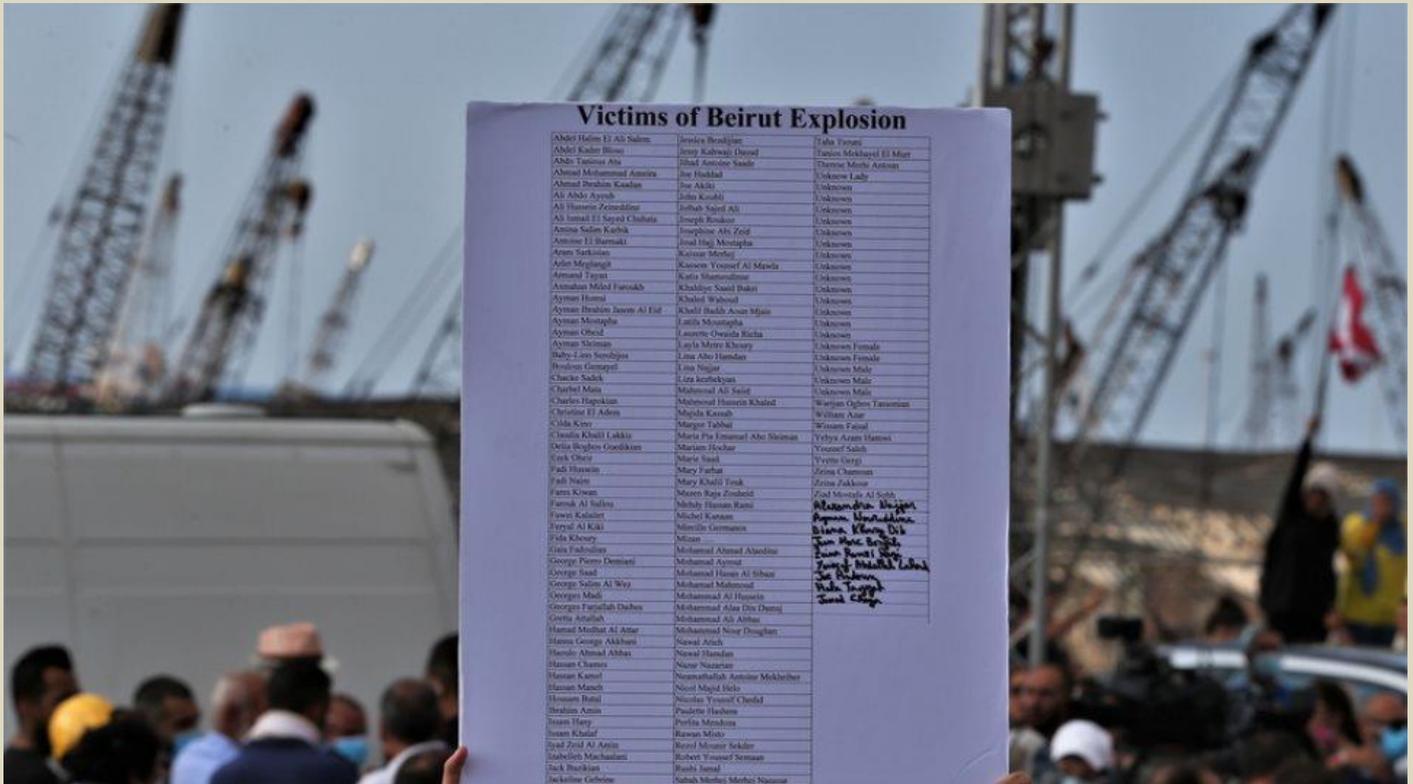
[Prokoshev spoke to Siberia Realities on August 5](#) about the horrors he experienced working for Grechushkin on that run. Shippers prey on the glut of men looking for work, and Grechushkin was no exception. Prokoshev agreed to be master of the *Rhosus*, an aging ship he'd helmed before, even though it was loaded with dangerous cargo. "The steamer, of course, is not very comfortable, the conditions are difficult, but where can I go?" Prokoshev said. "I needed the work."

Prokoshev saw the first red flag during the Istanbul layover. "I see the whole crew is changing for some reason. It struck me as suspicious." Grechushkin quickly dismissed his captain's concerns, but later, Prokoshev learned that the seamen had jumped ship because they hadn't been paid for four months. (They ended up filing a suit with their labor union.)



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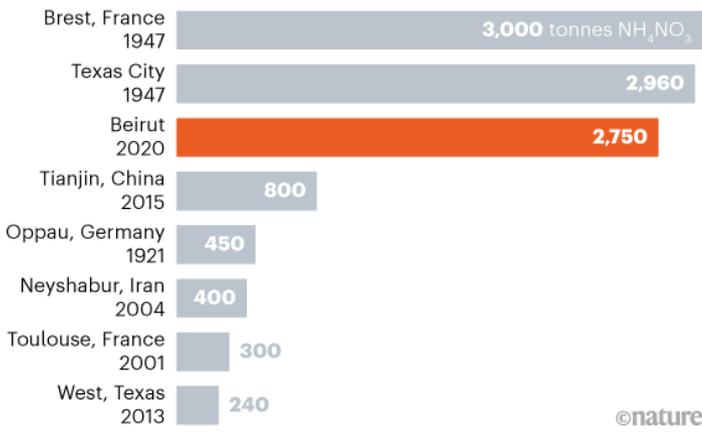
The *Rhosus* then made a pit-stop in Piraeus, Greece, for refueling and provisioning. There, Prokoshev says, Grechushkin “himself came and returned almost [all the food] back to the suppliers. He did not pay. He said there was no money.” Instead, to generate cash, Grechushkin sent the ship to Beirut to take on more cargo.



Although the *Rhosus* was already loaded with tons of ammonium nitrate, Grechushkin contracted to carry heavy road equipment on her deck. While docked at the Beirut port, Prokoshev was alarmed to see a hatch cover sagging under the weight of the machinery.

EXPLOSIVE CHEMICAL

The Beirut blast, which killed at least 220 people and injured more than 5,000, is one of the largest industrial disasters ever linked to ammonium nitrate (NH₄NO₃).



The captain knew that an overloaded ship is a deadly ship, so he pushed back against the vessel’s owner, risking his job to save his life. “But [Grechushkin] didn’t care!” Prokoshev says.

The ship wouldn’t be able to leave anyway, because Grechushkin hadn’t ponied up the port fee. While the Lebanese were holding the *Rhosus* at the dock, the fresh crew heard that the previous crew hadn’t been paid. They went on strike and eventually left the ship. According to additional reports, Lebanese inspectors also determined that the *Rhosus* was in serious disrepair. The *Rhosus* was doomed to stay put, tied to a Beirut dock. She would never sail again.

While the Lebanese government allowed most of the *Rhosus*’s crew to leave, the ship’s captain, chief engineer, third engineer, and boatswain were refused permission to disembark. The men had become pawns in a woefully low-

stakes game. Grechushkin refused to pay for his skeleton crew’s food while the vessel sat in port. (They survived through the kindness of local workers.) He refused to pay the Beirut port fees. He refused to transfer the cargo. In a word, he’d abandoned the whole mess and absconded to Cyprus with something like \$1 million in his pocket.

The *Rhosus* and her stockpile of ammonium nitrate were now Lebanon’s problem. But Lebanon had enough problems of its own. Its government was barely functioning. Once part of the Ottoman Empire, Lebanon’s borders had been arbitrarily drawn by a League of Nations mandate following the First World War. The British got Palestine, Jordan, and Iraq. France got Syria and Lebanon. Randomness underpinned the so-called Pax Syria



plan, which was designed to ensure eternal European dominance in the region. Drawing up fake borders sowed instability. Just stoke the ethnic and religious animosities that had smoldered over 400 years of Ottoman Empire rule, then sit back and wait for the cries for help.

The plan worked like a charm. Over the past century, Christian, Muslim, and Druze sects have torn each other apart in civil war after civil war, fighting for religious and ethnic dominance. The founding of Israel in 1948 added kindling to the blaze. And in came the white saviors—the US, the UN, the IMF—again and again, to mediate an always imperfect peace.

By 2013, after decades of civil strife and Syrian attacks, Lebanon's government was a sloppy mess.

The four men trapped on *Rhosus* while she was anchored in Beirut eventually peddled the ship's fuel to pay for a lawsuit against the Lebanese government. After eleven months, they were released from their floating prison. Once they were gone, Lebanese officials found themselves with a ship they didn't want and a cargo they couldn't figure out how to sell. The cargo's original owner—the mysterious entity that had paid Grechushkin \$1 million for the ammonium nitrate—never claimed it. Maybe the buyer was embarrassed that they'd been duped. Another shady deal gone bad in a murky world of shady deals. This shit happens all the time in shipping, you know? Gamble on a Russian, pay in cash, and sometimes you get *screwskied*.

The Lebanese warehoused the AM and left the *Rhosus* rotting in the port. Prokoshev theorizes that the Lebanese didn't sell their bounty because the officials there were so corrupt and incompetent that they couldn't agree on how to divvy up the profits. Given

that Lebanon's government is paralyzed by graft, he's probably right. Several port officials warned higher-ups—including the Prime Minister—about the danger of leaving the AM there, [according to a Reuters report](#), but they were roundly ignored.

Greek Navy's gunship 'IKARIA' is sailing for the port of Beirut carrying armed forces' medical and nursing staff, medicines and material collected by the Civil Protection and Crises Management Deputy Ministry.



The *Rhosus*, meanwhile, rotted at the Beirut dock until someone cut her loose. She drifted north of the port and finally sank parallel to the breakwater opposite the explosion site. It's

still there. The [New York Times analyzed satellite photos](#) and precisely located the hull. That no one bothered to move the rotting hunk in all that time is astounding to me. A sunken ship is a major environmental and marine traffic hazard.

That fact, perhaps even more than the warehoused AM, speaks volumes about the state of Lebanon. Beirut's port is Lebanon's lifeline. We now know that 80 percent of the nation's grain was stored at the port. At the very least, you'd expect a country so dependent on imports to keep its shipping lanes dredged and cleared.

When the exploding AM sent a tremendous shockwave through the city, the world learned what any ship's captain pulling into port could have told you: Lebanon is broken. The fault lines created by western powers a century ago have only deepened.

On Sunday, as if following the Pax Syriana script, [French president Emmanuel Macron urged world leaders](#) to rush to Beirut's aid and "work together to ensure that neither violence nor chaos prevails." On Monday, when Prime Minister Hassan Diab announced that the entire government would resign, Lebanon's inability to rule itself seemed all but confirmed.

Photos in this article are Editor's choice

Rachel Slade is a Boston-based freelance journalist and the Mountbatten Award-winning author of [Into the Raging Sea: Thirty-Three Mariners, One Megasorm, and the Sinking of El Faro](#), a New York Times Notable Book of the Year.

Army Strikes Hamas Targets After Gaza Incendiary Balloons Scorch Southern Israel

Source: <https://www.haaretz.com/israel-news/.premium-army-strikes-hamas-targets-after-gaza-incendiary-balloons-scorch-southern-israel-1.9071961>

Aug 14 – The Israeli army said in the early hours of Friday it struck Hamas targets in the Gaza Strip in response to explosive-laden balloons that have been continuously launched from Gaza over the past week.



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The IDF Spokesperson's Unit said that fighter jets, attack helicopters and tanks struck a [Hamas](#) post housing an aerial defense system, underground infrastructure and an observation post belonging to the militant organization in the coastal enclave.

"The terrorist Hamas organization is responsible for everything that emanates from the [Gaza Strip](#) , and it will be held accountable for the terrorist activities carried out against Israel's citizens," the IDF statement read.

Israel's firefighting services said that 21 fires caused by incendiary balloons broke out on Wednesday in the country's south, and 24 fires were sparked the previous day. Fires caused by balloon bombs have broken out every day over the past eight days.

On Thursday, [Israel announced it would stop all import of fuel](#) into Gaza following a week of escalating confrontations between Israel and Gaza-based groups.



The decision was taken by Defense Minister Benny Gantz, following consultations with security officials, "in light of the continued spate of incendiary balloons launched from the Gaza Strip into the territory of the State of Israel, and the undermining of security and stability," the IDF said.

This came after the military struck Hamas positions on Wednesday as well.

During the attack, a Hamas naval force compound, underground infrastructure and observation posts were targeted.

The restriction of fuel deliveries [was a regular move by Israel's defense establishment](#) during the 2018 and 2019 border clashes on the sidelines of the Great March of Return protests. Critics say that,

given the dire economic situation of the coastal enclave, it amounts to collective punishment.

Also on Wednesday, [Israel said it would limit Gaza's fishing zone](#) , reducing it by almost half from 15 to 8 nautical miles, in light of the incendiary balloons.

On Monday, Israel announced that it would shut the Kerem Shalom border crossing following days of incendiary balloon launches after a months-long lull.

The Rafah border crossing with Egypt reopened on Tuesday, for three days, on humanitarian grounds. Pictures showed Palestinians queuing for the necessary permits, ending months of isolation since the crossing was closed in mid-March to stem the coronavirus outbreak.



EDITOR'S COMMENT: This is not an innovative modus operandi; rather a copy and paste of history (e.g. Operation Outward [UK; WWII]; Fu-Go [Japan; WWII]; E-77 Ballon Bomb/ WS-124A Flying Cloud (USA)).

Beirut explosion: former port worker says fireworks stored in hangar

By Martin Chulov in Beirut, Michael Safi in Amman and Peter Beaumont in London

Source: <https://www.theguardian.com/world/2020/aug/07/beirut-explosion-former-port-worker-says-fireworks-stored-in-hangar>

Aug 07 – Dozens of bags of fireworks were stored in the same hangar as thousands of tonnes of ammonium nitrate at Beirut's port and may have been a decisive factor in igniting the explosive chemical compound [that fuelled Tuesday's huge explosion](#) , a former port worker and other sources have told the Guardian.

As angry Lebanese [plan a major protest in central Beirut on Saturday](#) , scrutiny has focused on how 2,750 tonnes of the dangerous material could have been stored so close to residential neighbourhoods for years – despite repeated warnings of the risk it posed.

A former port worker, Yusuf Shehadi, told the Guardian he had been instructed by the Lebanese military to house the chemicals in warehouse 12 at the port despite repeated protests by other government departments.



“We complained a lot about this over the years,” said Shehadi, who worked at the port until emigrating to Canada in March this year. “Every week, the customs people came and complained and so did the state security officers. The army kept telling them they had no other place to put this. Everyone wanted to be the boss, and no one wanted to make a real decision.”



In addition, the hangar housed a quantity of fireworks, Shehadi said, which customs had confiscated in about 2009-10 and which he said he had personally seen delivered on a forklift. **“There were 30 to 40 nylon bags of fireworks inside warehouse 12,” he said.**

An aerial view shows the port of Beirut on 7 August 2020, three days after the huge explosion. The Lebanese Red Cross says dozens of port workers may still be buried under debris. Photograph: AFP/Getty Images

“They were on the left-hand side when you entered the door. I used to complain about this. It wasn’t safe. There was also humidity there. This was a disaster waiting to happen. The port workers did not put the chemicals there in

the first place. That outrage rests with the government.”

A **second source** has confirmed the fireworks’ presence, which was also the subject of media reports in [Lebanon](#) on Friday.

The emerging new picture of the circumstances that led to the blast comes as investigators and media organisations continue to try to piece together the cause of the fire and subsequent blast.

The claim that fireworks were being stored in the same warehouse as the ammonium nitrate appears to be confirmed by phone footage, apparently filmed by a port worker from the roof of the grain silos that overlooked the seat of the biggest blast – now a 150-metre-wide crater of seawater.

In the brief section of footage [posted on social media](#), a long warehouse – running parallel to the grain silo and separated by a road – is visible, with smoke coming out of the windows on its west side and from the roof.

Geotagging by the investigative website Bellingcat and the Guardian, and comparison of features, strongly suggests that this warehouse is located at the very centre of the devastating blast –locating the initial fire and subsequent explosions in the same area of warehousing.

As the person on the silo roof films the north end of the warehouse from their vantage point, the smoke thickens and then a dozen or so white flashes can be seen occurring in rapid succession inside, triggering thicker red flames that quickly spread southwards before detonating a major explosion in the building within seconds that causes the person filming to duck for cover.

Shehadi said he had spoken to former colleagues at the port who said **workers were attempting to fix a gate outside warehouse 12 with an electrical tool ahead of the blast. “This was at 5pm, and after 30 minutes they saw smoke. Firefighters came, and so did state security. Everyone died.”**

A video posted to social media depicted firefighters tackling a small blaze in a warehouse that resembled a port building. “It is my belief that this repair work led to this catastrophe,” Shehadi said.

The Lebanese investigation into the disaster is expected to report to the national cabinet by Sunday. Sixteen people linked to the port including its general manager have been placed under house arrest, but figures including the French president, Emmanuel Macron, [have called for an independent international inquiry](#).

The country’s president, Michel Aoun, said the cause of the blast was still unclear and did not rule out the possibility of a hostile act. “The cause has not been determined yet,” Aoun said. “There is a possibility of external interference through a rocket or bomb or other act.”

The Lebanese Red Cross estimated that dozens of people could still be buried under debris from the blast, mostly port employees who worked in and around the hangar.

New footage of huge explosion ripping through Beirut hospital (St. George Hospital University Medical Center)

Source: https://www.youtube.com/watch?time_continue=60&v=ICufivZJNUQ&feature=emb_logo



Following Beirut Blast, Hezbollah's 'Deep State' Investigates Itself

Source: <https://www.meforum.org/61389/hezbollahs-deep-state-investigates-itself>

Beirut blast: The other countries with dangerous dumps of explosives

By Frank Gardner (BBC security correspondent)

Source: <https://www.bbc.com/news/world-53755289>

Aug 12 – The devastating explosion in Beirut is a grim reminder of a deeply troubling fact: the thousands of tonnes of ammonium nitrate unsafely stored in that city's port is not the only site at risk of spontaneous detonation.

In the Philippines, Ukraine, Georgia, Libya and Guinea-Bissau there are dangerous dumps of munitions left over from both past and present conflicts, some of them perilously close to residential areas.

According to the Swiss-based monitoring agency Small Arms Survey, between 1979 and August last year almost 30,000 people across 101 countries were killed or injured by unplanned explosions at munitions sites (UEMS).

Of the 606 recorded incidents, nearly three quarters involved state-owned stockpiles. One of the worst explosions took place at Brazzaville in the Republic of Congo in 2012, killing more than 500 people.

Simon Conway, a senior director with the British mine-clearing charity Halo Trust, says the first step needed is to get governments to admit that these arms depots are unsafe. "They are not considered to be a problem until they explode," he says.

Image copyright AFP Image caption The explosion in the Republic of Congo in 2012 caused widespread damage

The next step is to bring in people with the right expertise to move the explosive stores away from residential areas and then destroy them.

"Often these sites have poor security and it would be all too easy for ingredients to go missing that later turn up in an IED [improvised explosive device]," says Mr Conway.

So, after Beirut, where else should we be worried about today? Which other sites are what munitions experts consider to be potential ticking time bombs?

The Philippines

On an overgrown snake-infested island in Manila Bay sits a store of deteriorating US munitions dating back to World War Two. Rusting shells, depth charges, mortar bombs and other projectiles litter the floor of a bunker while crates of explosives and propellant charges are stacked all the way up to the ceiling.



Projectiles litter the floor of a bunker on Caballo Island

The Halo Trust estimates that on Caballo Island and at another site nearby there are a total of 1.6 million explosive items - enough, it is feared, to potentially destroy the local airport at Corregidor and threaten passing ships in Manila Bay. Mr Conway, who has inspected the site with the Philippine military, says there are two sheds containing 200,000 anti-aircraft rounds. "If those sheds went up it would definitely affect the nearby airport," he says.

There are more World War Two munitions stored at a naval base close to the capital, Manila, where Mr Conway says they are dangerously stored next to

modern artillery rounds.

The horror of what happened in Beirut port has not been lost on local authorities there. Within days the Philippines Navy called Halo to discuss how best to dispose of all this ammunition safely.

Guinea-Bissau

One of the most concerning sites is in the West African state of Guinea-Bissau where an unknown quantity of Soviet-era aircraft bombs are corroding in the heat and humidity in several sheds, close to centres of population.

Some of the bombs date back to the 1950s and are thought highly unstable. The site of most concern sits next to the country's second city of Bafata with a population of 22,500.



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Talks with the government on how to safely dispose of it have been under way since 2005 but have been slowed by local politics. The Halo Trust says they have begun building safer depots but as yet, nothing has been destroyed.

Libya

Libya has been awash with weapons and munitions ever since the revolution of 2011 that overthrew the regime of Muammar Gaddafi. The UN estimates there are more than 200,000 tonnes of munitions unaccounted for, beyond government control.

"This stuff is easily trafficked down to the Sahel countries or elsewhere," says Mr Conway.

On 6 May there was an initial explosion at an ammunition store outside the town of Misrata, followed by days more of subsequent explosions as missiles, rockets and aircraft bombs blew up, scattering shrapnel over a wide area and causing an unknown number of casualties.

Halo has been working to make safe the remaining unexploded ordnance. Today one of the sites of most concern is the large Gaddafi-era arms depot at Mizdah which is close to a town of over 20,000 people.

Those trying to clear up these hazards are not only having to cope with the restrictions caused by Covid-19 but also with the perpetual dangers of Libya's ongoing civil war.

Ukraine

Like several of the former Soviet republics, Ukraine has a number of arms dumps left over from when it was part of the USSR.

In 2017 two of these exploded. One in eastern Ukraine blew up a huge store of missiles and artillery shells, prompting the evacuation of more than 20,000 residents living within 10km (six miles) of the dump.

Later that year another arms dump explosion caused a giant fireball, visible from a great distance, destroying an estimated 32,000 tonnes of munitions and again sending projectiles high into the air.

Both Kazakhstan and Uzbekistan have also suffered from unplanned explosions at arms dumps.

Breakaway Georgian republic of Abkhazia

In August 2017 an unplanned explosion at a warehouse on the Black Sea storing more than 2,000 tonnes of high explosive ammunition sent missiles and other projectiles up into the air that landed up to 12km away.

The site of the explosion that is now being cleaned up

The Halo Trust has been clearing up the area ever since, destroying more than 90,000 items but a third of the affected area has still to be made safe.

For all of these countries the explosion in the Lebanese capital is a terrifying reminder of what can happen when unstable explosive material is unsafely stored.

Munitions experts are now hoping that if anything positive can possibly come out of the tragedy in Beirut, it will be a renewed global urgency to make these stockpiles safe, before it is too late.



One Step Closer to Bomb-Sniffing Cyborg Locusts

Source: <http://www.homelandsecuritynewswire.com/dr20200818-one-step-closer-to-bombsniffing-cyborg-locusts>

Aug 18 – If you want to enhance a locust to be used as a bomb-sniffing bug, there are a few technical challenges that need solving before sending it into the field.

Is there some way to direct the locust — to tell it where to go to do its sniffing? And because the locusts can't speak (yet), is there a way to read the brain of these cyborg bugs to know what they're smelling?

For that matter, can locusts even smell explosives?

Yes, and yes to the first two questions. Previous research from Washington University in St. Louis has demonstrated both the ability to control the locusts and the ability to read their brains, so to speak, to discern what it is they are smelling. And now, thanks to new research from the McKelvey School of Engineering, the third question has been settled.



The answer, again: ‘yes.’

WUSTL [says](#) that in a pre-proof published online in the journal [Biosensors and Bioelectronics: X](#), researchers showed how they were able to hijack a locust’s olfactory system to both detect and discriminate between different explosive scents — all within a few hundred milliseconds of exposure.

They were also able to optimize a previously developed biorobotic sensing system that could detect the locusts’ firing neurons and convey that information in a way that told researchers about the smells the locusts were sensing.



“We didn’t know if they’d be able to smell or pinpoint the explosives because they don’t have any meaningful ecological significance,” said Barani Raman, professor of biomedical engineering. “It was possible that they didn’t care about any of the cues that were meaningful to us in this particular case.”

[Previous work in Raman’s lab](#) led to the discovery that the locust olfactory system could be decoded as an ‘or-of-and’s’ logical operation. This allowed researchers to determine what a locust was smelling in different contexts. With this knowledge, the researchers were able to look for

similar patterns when they exposed locusts to vapors from TNT, DNT, RDX, PETN and ammonium nitrate — a chemically diverse set of explosives. “Most surprisingly,” Raman said, “we could clearly see the neurons responded differently to TNT and DNT, as well as these other explosive chemical vapors.”

With that crucial piece of data, Raman said, “We were ready to get to work. We were optimized.”

Now they knew that the locusts could detect and discriminate between different explosives, but in order to seek out a bomb, a locust would have to know from which direction the odor emanated. Enter the “odor box and locust mobile.”

“You know when you’re close to the coffee shop, the coffee smell is stronger, and when you’re farther away, you smell it less? That’s what we were looking at,” Raman said. The explosive vapors were injected via a hole in the box where the locust sat in a tiny vehicle. As the locust was driven around and sniffed different concentrations of vapors, researchers studied its odor-related brain activity.

The signals in the bugs’ brains reflected those differences in vapor concentration.

The next step was to optimize the system for transmitting the locusts’ brain activity. The team, which included [Shantanu Chakrabarty](#), the Clifford W. Murphy Professor in the Preston M. Green Department of Electrical & Systems Engineering, and [Srikanth Singamaneni](#), the Lilyan & E. Lisle Hughes Professor in the Department of Mechanical Engineering & Materials Science, focused the breadth of their expertise on the tiny locust.

In order to do the least harm to the locusts, and to keep them stable in order to accurately record their neural activity, the team came up with a new surgical procedure to attach electrodes that didn’t hinder the locusts’ movement. With their new instrumentation in place, the neuronal activity of a locust exposed to an explosive smell was resolved into a discernible odor-specific pattern within 500 milliseconds.

“Now we can implant the electrodes, seal the locust and transport them to mobile environments,” Raman said. One day, that environment might be one in which [Homeland Security](#) is searching for explosives.

The idea isn’t as strange as it might first sound, Raman said.

“This is not that different from in the old days, when coal miners used canaries,” he said. “People use pigs for finding truffles. It’s a similar approach — using a biological organism — this is just a bit more sophisticated.”

VENUS tech more accurately detects mines by giving them a buzz

Source: <https://newatlas.com/good-thinking/venus-landmine-detection/>

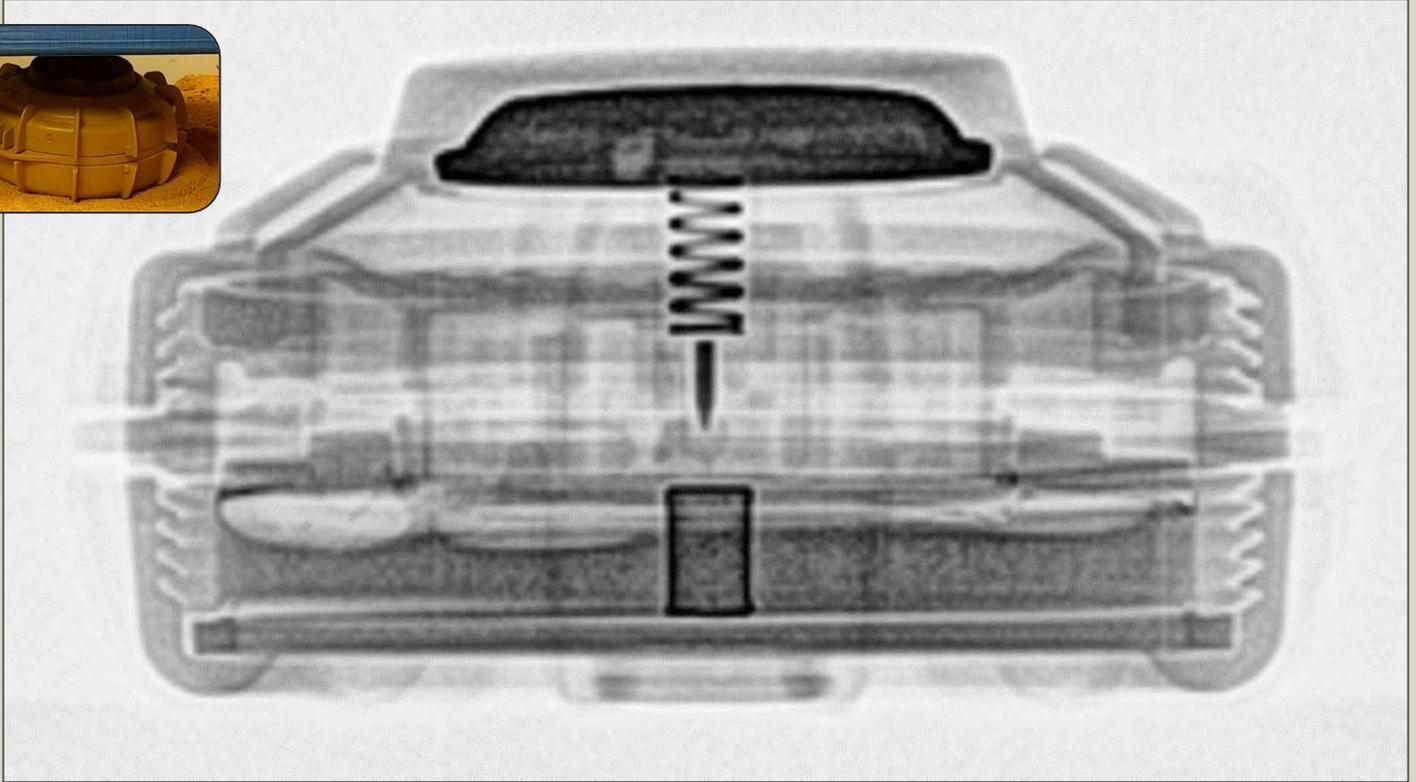
Aug 19 – The excavation and disposal of landmines is a time- and labor-intensive business, so it can be quite a waste of resources if the detected object is not actually a mine. A new system could help, by reducing the number of mine-hunting errors.

Currently, most landmine-detection technologies work by detecting the electromagnetic signature that’s passively emitted by the mine. Unfortunately, though, other buried metal objects – or even patches of wet or magnetic soil – have similar signatures, to the extent that they’re often mistaken for mines.



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That's where the US Army's VENUS (Vibration-ENhanced Underground Sensing) system comes in. It is being developed via a partnership between the Army Research Office (ARO), North Carolina State University, the Georgia Institute of Technology, and defense tech company Vadum, Inc.



An x-ray image of a VS-50 antipersonnel landmine, showing the metal components within. Army Research Office



The setup sends a pulsed magnetic field down into the soil, which causes the small metal parts within a mine to vibrate in a distinct manner. It is those vibrations that are detected by the VENUS device's high dynamic range vibrometer. According to the ARO, most other buried objects either don't respond to the magnetic field, or if they do, their vibrations are much different than those produced by mines.

As part of a two-year project, the designers will now be working on miniaturizing and ruggedizing the technology, and on collecting vibrational data from landmines in a variety of soil conditions.

"New concepts are rare in the area of landmine detection," says ARO program manager, Dr. James Harvey. "This advance has the potential to be a game changer."

Source: [Army Research Laboratory](https://www.army.mil/Research-Laboratory)

Beirut Blast Impact Reflects in Virus Cases

Source: <http://www.naharnet.com/stories/en/274331-beirut-blast-impact-reflects-in-virus-cases>

Aug 22 – A two-week partial lockdown and nighttime curfew kicked off Friday in Lebanon after coronavirus cases increased sharply following an explosion in Beirut that killed and injured thousands of people.

Confirmed cases of the virus have increased from 5,417 a day after the massive blast on Aug. 4 to more than 11,000 on Friday, leading officials to announce the lockdown.

On Friday, Lebanon's Health Ministry tallied a record 628 confirmed new cases in the previous 24 hours, raising the total registered cases since late February to 11,580.

The pandemic has killed 116 people in the tiny country, which was successful in limiting the spread of the virus during the early months.



Many businesses were closed Saturday morning in Beirut even though some sectors, including banks, groceries, book shops and pharmacies were allowed to open. Restaurants, night clubs, beaches and clothes shops are among the businesses ordered to close by the Ministry of Interior.

The country's top Sunni Muslim authority ordered all mosques closed and suspended prayers inside them around Lebanon until further notice.

Virus cases had already been on the rise since the beginning of July, when an earlier lockdown was lifted and Lebanon's only international airport was reopened. At the end of June, Lebanon registered 1,778 cases. That number has since multiplied more than five times in seven weeks.

But the numbers shot up dramatically following the Aug. 4, explosion of nearly 3,000 tons of ammonium nitrate stored at Beirut's port. More than 180 people were killed, more than 6,000 injured and a quarter of a million people were left with homes unfit to live in. The blast overwhelmed the city's hospitals and also badly damaged two that had a key role in handling virus cases.

After the blast, medical officials have warned of

increased risk of catching the virus because of crowding at hospitals and funerals, or as people searched through the rubble. Protests and demonstrations also broke out after the blast as Lebanese vented their anger at authorities.

The virus causes mild to moderate symptoms in most people, who recover within a few weeks. But it is highly contagious and can cause severe illness or death, particularly in older patients or those with underlying health problems.

Lebanon's health sector has been challenged by the pandemic that hit amid an unprecedented economic and financial crisis.

EOD Soldiers to Get Better Protection Technology

Source: <https://i-hls.com/archives/103526>

Aug 22 – A new development will provide soldiers with more protection than before, which will allow for a greater focus on the mission and increase survivability.

Explosive Ordnance Disposal (EOD) Soldiers have one of the most life-threatening jobs in the military. They not only must be able to defend themselves in the battle space, but also protect themselves from the unpredictable environment that explosives create.

Program Executive Office (PEO) Soldier is addressing both of these concerns with the **Next Generation Advanced Bomb Suit** (NGABS), the latest development in Soldier protective equipment.

The NGABS increases Soldier readiness to respond to evolving threats by providing 360-degree ballistic protection and reducing weight burdens via its modular scalable design. The increased mobility and enhanced protection that these features offer can be tailored to various situations globally and support increased survivability of the force.

The NGABS' innovative Modular Sensor Suite MSS incorporates visible, Low Light, and Long Wave infrared data and sensors with the ability to fuse them for display in the suit's **Heads Up Display** (HUD). This pushes technology advancement in the C5ISR arena and delivers an increase in situational awareness that enhances mission capabilities.

NGABS also offers the first ever ballistic protection against small arms threats.

The legacy ABS systems provide no situational awareness during obscured and low light level operations. With NGABS, the MSS is fed to the newly-designed HUD inside the bomb suit's protective visor, according to dvidshub.net.



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CYBER NEWS



INTERPOL Report Shows Alarming Rate of COVID-19 Related Cyber Attacks

Source: <https://www.hstoday.us/subject-matter-areas/cybersecurity/interpol-report-shows-alarming-rate-of-covid-19-related-cyber-attacks/>

Aug 04 – An INTERPOL assessment of the impact of COVID-19 on cybercrime has shown a significant target shift from individuals and small businesses to major corporations, governments and critical infrastructure.

With organizations and businesses rapidly deploying remote systems and networks to support staff working from home, criminals are also taking advantage of increased security vulnerabilities to steal data, generate profits and cause disruption.

In one four-month period (January to April) some 907,000 spam messages, 737 incidents related to malware and 48,000 malicious URLs – all related to COVID-19 – were detected by one of INTERPOL’s private sector partners.

“Cybercriminals are developing and boosting their attacks at an alarming pace, exploiting the fear and uncertainty caused by the unstable social and economic situation created by COVID-19.”

Jürgen Stock, INTERPOL Secretary General. “The increased online dependency for people around the world is also creating new opportunities, with many businesses and individuals not ensuring their cyber defences are up to date.”

Key findings highlighted by the INTERPOL assessment of the cybercrime landscape in relation to the COVID-19 pandemic include:

- **Online Scams and Phishing.** Threat actors have revised their usual online scams and phishing schemes. By deploying COVID-19 themed phishing emails, often impersonating government and health authorities, cybercriminals entice victims into providing their personal data and downloading malicious content. Around two-thirds of member countries which responded to the global cybercrime survey reported a significant use of COVID-19 themes for phishing and online fraud since the outbreak.
- **Disruptive Malware (Ransomware and DDoS).** Cyber criminals are increasingly using disruptive malware against critical infrastructure and healthcare institutions, due to the potential for high impact and financial benefit. In the first two weeks of April 2020, there was a spike in ransomware attacks by multiple threat groups which had been relatively dormant for the past few months. Law enforcement investigations show the majority of attackers estimated quite accurately the maximum amount of ransom they could demand from targeted organizations.
- **Data Harvesting Malware.** The deployment of data harvesting malware such as Remote Access Trojan, info stealers, spyware and banking Trojans by cybercriminals is on the rise. Using COVID-19 related information as a lure, threat actors infiltrate systems to compromise networks, steal data, divert money and build botnets.
- **Malicious Domains.** Taking advantage of the increased demand for medical supplies and information on COVID-19, there has been a significant increase of cybercriminals registering domain names containing keywords, such as “coronavirus” or “COVID”. These fraudulent websites underpin a wide variety of malicious activities including C2 servers, malware deployment and phishing. From February to March 2020, a 569 per cent growth in malicious registrations, including malware and phishing and a 788 per cent growth in high-risk registrations were detected and reported to INTERPOL by a private sector partner.
- **Misinformation.** An increasing amount of misinformation and fake news is spreading rapidly among the public. Unverified information, inadequately understood threats, and conspiracy theories have contributed to anxiety in communities and in some cases facilitated the execution of cyberattacks. Nearly 30 percent of countries which responded to the global cybercrime survey confirmed the circulation of false information related to COVID-19. Within a one-month period, one country reported 290 postings with the majority containing concealed malware. There are also reports of misinformation being linked to the illegal trade of fraudulent medical commodities. Other cases of misinformation involved scams via mobile text-messages containing ‘too good to be true’ offers such as free food, special benefits, or large discounts in supermarkets.

Future primary areas of concern highlighted by the INTERPOL report include.

- A further increase in cybercrime is highly likely in the near future. Vulnerabilities related to working from home and the potential for increased financial benefit will see cybercriminals continue to ramp up their activities and develop more advanced and sophisticated modi operandi.
- Threat actors are likely to continue proliferating coronavirus-themed online scams and phishing campaigns to leverage public concern about the pandemic.
- Business Email Compromise schemes will also likely surge due to the economic downturn and shift in the business landscape, generating new opportunities for criminal activities.
- When a COVID-19 vaccination is available, it is highly probable that there will be another spike in phishing related to these medical products as well as network intrusion and cyberattacks to steal data.

[Download the full report at INTERPOL](#)



Hezbollah hones expertise in training cyber-warfare agents

Source: <https://www.jpost.com/middle-east/hezbollah-hones-expertise-in-training-cyber-warfare-agents-638800>

Aug 16 – Many universities around the globe have had their operations disrupted by COVID-19. But Hezbollah's school of cyberwarfare remains open for instruction.

According to a recent report by the *Daily Telegraph*, the Lebanon-based terror organization is still flying in recruits from around the Arab world for courses in how to “digitally manipulate photographs, manage large numbers of fake social media accounts, make videos, avoid Facebook’s censorship, and effectively spread disinformation online.”

These electronic warriors return to their home bases, particularly to Iraq, and pass along the knowledge they’ve acquired, helping to sow the seeds of disinformation and chaos across the region.

Cyberterrorism experts say Hezbollah’s education, which rakes in big bucks for the organization, is second to none, imported from Iran and fine-tuned over two decades.

“Hezbollah set up a course on how to do this. This was before the term ‘fake news’ was ever used, and before the use of bots, as a means of influence to change perceptions,” Edan Landau, head of the Database Desk at the International Institute for Counter-Terrorism, told *The Media Line*.

“Look at the hoax in 2006, when Hezbollah released photographs purporting to show an Israeli missile strike on Red Cross ambulances. Major media outlets around the globe ran with it,” said Landau. But the photos and stories behind them didn’t hold up to scrutiny. “Hezbollah has adapted to today’s technology. It’s now more about changing people’s perceptions through social media,” said Landau. “Hezbollah laid the groundwork for informational warfare long before ISIS was ever dreamed up,” a US State Department official who works on Middle East security matters told *The Media Line*. The official requested not to be identified due to the sensitivity of his work.

“Look at the similarities: Hezbollah’s propaganda emphasizes specific themes, like resistance, martyrdom and social services. And it smartly reaches beyond its Shi’ite base, proactively and consciously working to garner support from Lebanese Christians and Sunnis and the larger Arab and Islamic world.”

Hezbollah maintains a unit solely dedicated to psychological and informational warfare, comprising newspapers, social media outlets, dozens of websites in multiple languages and its far-reaching Al-Manar satellite TV station beaming from Beirut.

Much of the funding for Hezbollah’s electronic battlefield courses comes from Tehran, as does a good deal of the know-how. After the Stuxnet virus hit Iran’s nuclear facilities in 2010, the Islamic Republic invested heavily in cyber research and development for its own cyber abilities and morphed into a threat of its own. As a favored proxy, Hezbollah receives tools and training from Iran, putting the non-state actor’s operations on par with its nation-state rivals.

“This is one of the benefits of being a state within a state,” Maj. Gen. (res.) Yaakov Amidror, told *The Media Line*. Amidror served as national security adviser to Israeli Prime Minister Netanyahu.

“It’s easier to keep tabs on Iran, easier for companies like Facebook to shut down operations there, even easier to fly people in and out. Hezbollah is essentially Iran’s sub-contractor on this,” Amidror said.

Lately, Hezbollah’s disinformation recruitment focus has been on Iraq, particularly dealing with Kata’ib Hezbollah, or the Hezbollah Brigades, which earned its reputation fighting US and coalition forces in Iraq in 2003, filming attacks and publishing them online for propaganda and recruitment purposes. Its leader, Abu Mahdi al-Mohandes, was killed in a January US airstrike targeting Iranian Gen. Qasem Soleimani.

According to the *Daily Telegraph* report, Kata’ib Hezbollah has developed a digital propaganda team of 400 people, flooding Facebook with fake accounts and promoting fake news. The US government estimated that the entirety of Kata’ib Hezbollah was composed of 400 people less than a decade ago. Kata’ib Hezbollah and other Iraqi electronic armies have reportedly floated millions of dollars in advertising expenses to Facebook.

The impact of Iraq’s so-called “electronic armies” and mass manipulation of social media networks can’t be overestimated,” a senior United Arab Emirates diplomat told *The Media Line*, on condition of anonymity due to the sensitive nature of the topic. “These operations are incredibly damaging to efforts to stabilize Iraq. Even if Hezbollah is weakened following [last week’s] explosion [in Beirut], it is likely they will still be able to conduct these types of training camps.”

But it isn’t just Kata’ib Hezbollah flying its students into Lebanon for training. Iraqi politicians are now in their own electronic arms race and have flown activists to Beirut, where they are trained in the art of smear campaigns and incitement through social media activism and disinformation. In a place like Iraq, where government and media institutions are weak, social media is especially amplified, which makes Hezbollah’s training all the more valuable, and more in-demand than ever.



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DRONE NEWS



How to Hide from a Drone – the Subtle Art of “Ghosting” in the Age of Surveillance

By Austin Choi-Fitzpatrick

Source: <http://www.homelandsecuritynewswire.com/dr20200728-how-to-hide-from-a-drone-the-subtle-art-of-ghosting-in-the-age-of-surveillance>

July 28 – Drones of all sizes are being used by environmental advocates to monitor deforestation, by conservationists to track poachers, and by journalists and activists to document large protests. As a [political sociologist](#) who studies social movements and drones, I document a wide range of nonviolent and pro-social drone uses in my new book, [The Good Drone](#). I show that these efforts have the potential to democratize surveillance.

But when the Department of Homeland Security redirects large, fixed-wing drones from the U.S.-Mexico border to [monitor protests](#), and when towns experiment with using drones to [test people for fevers](#), it's time to think about how many eyes are in the sky and how to avoid unwanted aerial surveillance. One way that's within reach of nearly everyone is learning how to simply disappear from view.



Crowded Skies

Over the past decade there's been an explosion in the public's use of drones – everyday people with everyday tech doing [interesting things](#). As drones enter already-crowded airspace, the Federal Aviation Administration is [struggling to respond](#). The near future is likely to see even more of these devices in the sky, flown by an ever-growing cast of social, political and economic actors.

Public opinion about the use and spread of drones is still [up in the air](#), but burgeoning drone use has sparked numerous efforts to curtail drones. These responses range from public policies exerting community control over local airspace, to the development of sophisticated jamming equipment and tactics for knocking drones out of the sky.

From startups to major defense contractors, there is a scramble to deny airspace to drones, to hijack drones digitally, to control drones physically and to shoot drones down. Anti-drone measures range from simple blunt force, [10-gauge shotguns](#), to the poetic: [well-trained hawks](#).

Many of these anti-drone measures are expensive and complicated. Some are illegal. The most affordable – and legal – way to avoid drone technology is [hiding](#).

How to Disappear

The **first thing** you can do to hide from a drone is to take advantage of the natural and built environment. It's possible to wait for bad weather, since smaller devices like those used by local police have a hard time flying in high winds, dense fogs and heavy rains. Trees, walls, alcoves and tunnels are more reliable than the weather, and they offer shelter from the high-flying drones used by the Department of Homeland Security.

The **second thing** you can do is minimize your digital footprints. It's smart to avoid using wireless devices like mobile phones or GPS systems, since they have digital signatures that can reveal your location. This is useful for evading drones, but is also important for avoiding other privacy-invading technologies.

The **third thing** you can do is confuse a drone. Placing mirrors on the ground, standing over broken glass, and wearing elaborate headgear, [machine-readable blankets](#) or [sensor-jamming jackets](#) can break up and distort the image a drone sees.

Mannequins and other forms of mimicry can confuse both on-board sensors and the analysts charged with monitoring the drone's video and sensor feeds.

Drones equipped with infrared sensors will see right through the mannequin trick, but are confused by tactics that mask the body's temperature. For example, a space blanket will mask significant amounts of the body's heat, as will simply hiding in an area that matches the body's temperature, like a building or sidewalk exhaust vent.

The **fourth, and most practical, thing** you can do to protect yourself from drone surveillance is to get a disguise. The growth of mass surveillance has led to an explosion in creative experiments meant to mask one's identity. But some of the smartest ideas are decidedly old-school and low-tech. Clothing is the first choice, because hats, glasses, masks and scarves go a long way toward scrambling drone-based facial-recognition software.



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Your gait is as unique as your fingerprint. As gait-recognition software evolves, it will be important to also mask the key pivot points used in identifying the walker. It may be that the best response is affecting a limp, using a minor leg brace or wearing extremely loose clothing.

Artists and scientists have taken these approaches a step further, developing a [hoodie wrap](#) that's intended to shield the owner's heat signature and to scramble facial recognition software, and [glasses](#) intended to foil facial recognition systems.

Keep an Umbrella Handy

These innovations are alluring, but umbrellas may prove to be the most ubiquitous and robust tactic in this list. They're affordable, easy to carry, hard to see around and can be disposed of in a hurry. Plus you can build a [high-tech one](#), if you want.

It would be nice to live in a world with fewer impositions on privacy, one in which law enforcement did not use small quadcopters and the Department of Homeland Security did not redeploy large Predator drones to surveil protesters. And, for people in some parts of the world, it would be nice not to associate the sound of a drone with impending missile fire. But given that those eyes are in the sky, it's good to know how to hide.



Austin Choi-Fitzpatrick is Associate Professor of Political Sociology, University of San Diego.

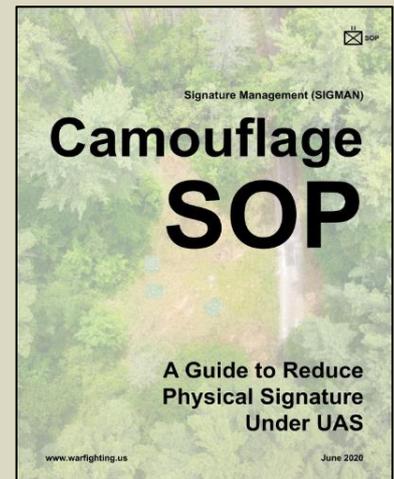
These Marines Just Published a How-To Guide on Hiding from Enemy Drones

Source: <http://www.2ndbn5thmar.com/camouflage/SIGMAN%20Camouflage%20SOP%20200630.pdf>

July 29 – You're a Marine operating with your squad at a forward location with little cover. A lookout spots a small, lightweight drone -- not a friendly -- flying far overhead. What do you do?

A new manual independently compiled by 11 seasoned Marines and veterans aims to answer that question and provide much more guidance to ground troops seeking to avoid detection against a growing enemy threat. Published at the end of June, the 96-page guide proposes a standard operating procedure, or SOP, for Marines training for and operating in an environment where enemy drones, more formally known as unmanned aerial systems, are part of the terrain.

Published on the unofficial infantry skills training website 2ndbn5thmar.com, the guide proposes code words Marines can use to signal that a UAS has been spotted; to tell the unit to camouflage itself; and to order an attack on the drone. It also offers detailed guidance on effective camouflage, building on existing practices such as covering a helmet with foliage and a vehicle with netting and adding in newer precautions such as heat signature masking.



Drone and Chemical Agent will Help Reopen Venues at COVID-19 Era

Source: <https://i-hls.com/archives/103392>

Aug 14 – The COVID-19 pandemic has ground sports, concerts, performances, graduations and other events to a screeching halt, impacting local and national economies worldwide. Facilities are eager to re-open, but to date, there was no complete solution for using drone technology to disinfect large facilities and arenas. Large-scale disinfecting is required by learning institutions, athletic facilities and other large infrastructures seeking safe, sanitary and seamless reopenings.

A new technology will address the disinfecting protocol shortcomings in the wake of COVID-19. The drone-powered disinfecting technology will be used in large indoor venues and outdoor facilities.

By consolidating superior drone technology with a highly effective, non-toxic disinfecting chemistry, Perpetual Motion is providing facility operators and building service contractors an all-in-one full-service solution to alleviate the pressing public health concerns around disinfecting.

The solution will blend safe and effective chemistry with sophisticated American-made drone technology.

Perpetual Motion is the first to bring to market state-of-the-art drone technology combined with an N-listed EPA-approved, hospital and food-grade neutral **Dual Quat disinfectant**



from Mark-V. This agent is safe for plants, animals and humans, according to uasweekly.com.



Once this is applied to disinfect, **Titania**, a non-friction, antimicrobial coating that adheres to any surface, provides an “armor shield” coat that’s effective for up to a year for continuous protection. Titania (Titanium dioxide, TiO₂) creates activated hydroxyl radicals to extract airborne contaminants and reorganizes their molecular structures into harmless everyday compounds. Organic materials coming in contact with the solution will break down upon contact, making it ideal for high-capacity venues that require thorough protection.

Newly Designed Nanowire Material for Face Masks Can Actually Destroy Pathogens

Source: <https://www.sciencealert.com/new-filter-paper-for-making-nanowire-masks-could-help-beat-coronavirus>

Aug 18 – The benefits of [wearing face masks](#) to help slow the spread of [COVID-19](#) are now well understood, but scientists are still searching for better materials to use – and a filter ‘paper’ made up of titanium oxide nanowires is showing a lot of promise.

The new material is so good at trapping pathogens, and destroying them when ultraviolet light is applied, it could also be used in air conditioning units and ventilation systems, according to the developers.

While the nanowire-based mask looks as though it’s made from regular filter paper, it brings extra antibacterial and antiviral properties to the material, making it far more effective at eliminating germs – and making it reusable, too.

"Since our filter is exceptionally good at absorbing moisture, it can trap droplets that carry [viruses](#) and bacteria," [says physicist László Forró](#), from the Laboratory of Physics of Complex Matter at EPFL in Switzerland.

"This creates a favourable environment for the oxidation process, which is triggered by light."

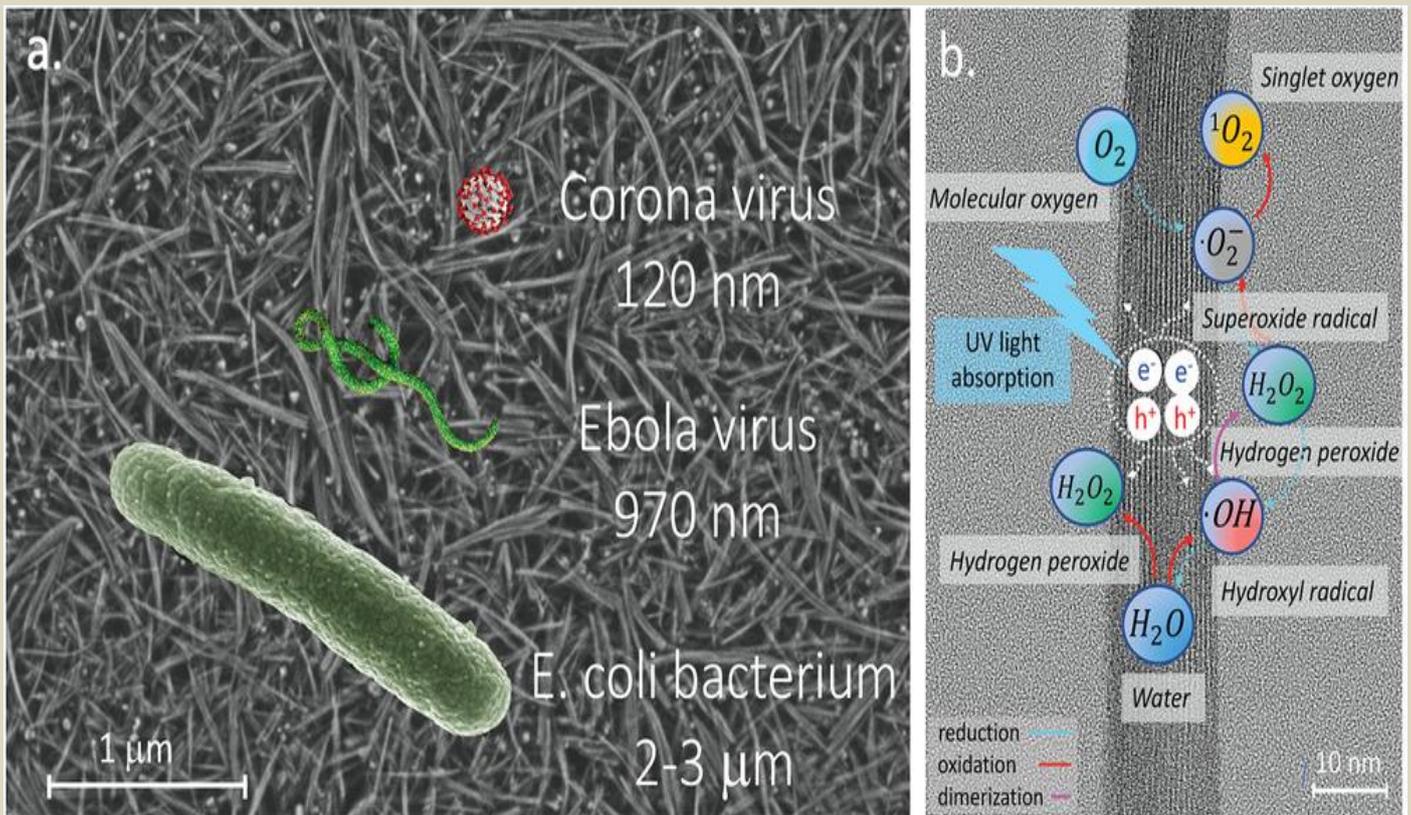
The photocatalytic properties of titanium dioxide are key – when ultraviolet light hits the mask, its fibres convert moisture held in the nanowires into oxidising agents (including hydrogen peroxide), which then have the potential to destroy pathogens upon contact.

In experiments on the material, the team showed how the filter could destroy [Escherichia coli](#) bacteria and degrade strands of DNA, essentially wiping out dangerous microorganisms in the mask itself.

While standard disposable paper masks – typically made from layers of non-woven polypropylene plastic microfibre – are also effective at stopping the spread of respiratory disease, they tend to just trap the pathogens, and can't be easily sanitised.

"In a hospital setting, these masks are placed in special bins and handled appropriately," [says Forró](#). "However, their use in the wider world – where they are tossed into open waste bins and even left on the street – can turn them into new sources of contamination."





a) The SEM image of the surface of the TiO₂NWs filter overlapped with the schematic representations of the example germs to be filtered out. b) Schematic illustration of photocatalytic processes leading to ROS generation at the humid surface of TiO₂NWs. The resulting photogenerated ROS inactivate all the microbial targets in its proximity.

The new material still needs to be tested with [SARS-CoV-2](#) specifically, but the researchers are confident that these nanowire masks can be useful in fighting the global [pandemic](#), given the results they've seen with *E. coli* and DNA strands.

Two of the study authors have established a startup called Swoxid, which will be the company moving to take this invention out into the world and develop the material as a commercial proposition. There are plenty of hurdles before any new invention can hit the market, but the team seems quite gung-ho about their prospects.

"As of today, the technology we propose, exclusively under laboratory conditions, will allow for the filter production capacity of about 100-200 m² per week. This is enough to fabricate 40,000 - 80,000 reusable masks monthly," [the researchers write in their study](#).

Such a best-case scenario can only take place after further development and research takes place, but the team's prototype certainly looks interesting.

As our understanding of [mask science](#) develops, experts are getting better at figuring out which masks [stop viral droplets](#) most effectively – and with COVID-19 still very much with us, a mask that can actively destroy the virus would be hugely useful, if we can get it.

►► The research has been published in [Advanced Functional Materials](#).

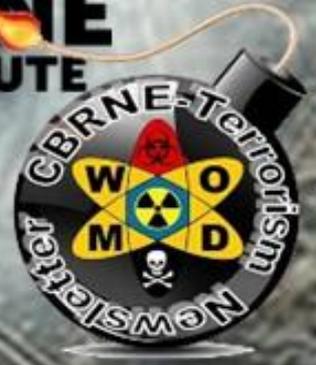
The Night A Mysterious Drone Swarm Descended on Palo Verde Nuclear Power Plant

Source: <https://www.thedrive.com/the-war-zone/34800/the-night-a-drone-swarm-descended-on-palo-verde-nuclear-power-plant>

The mysterious case of mass drone incursions over America's most powerful nuclear power plant that only resulted in more questions and no changes.



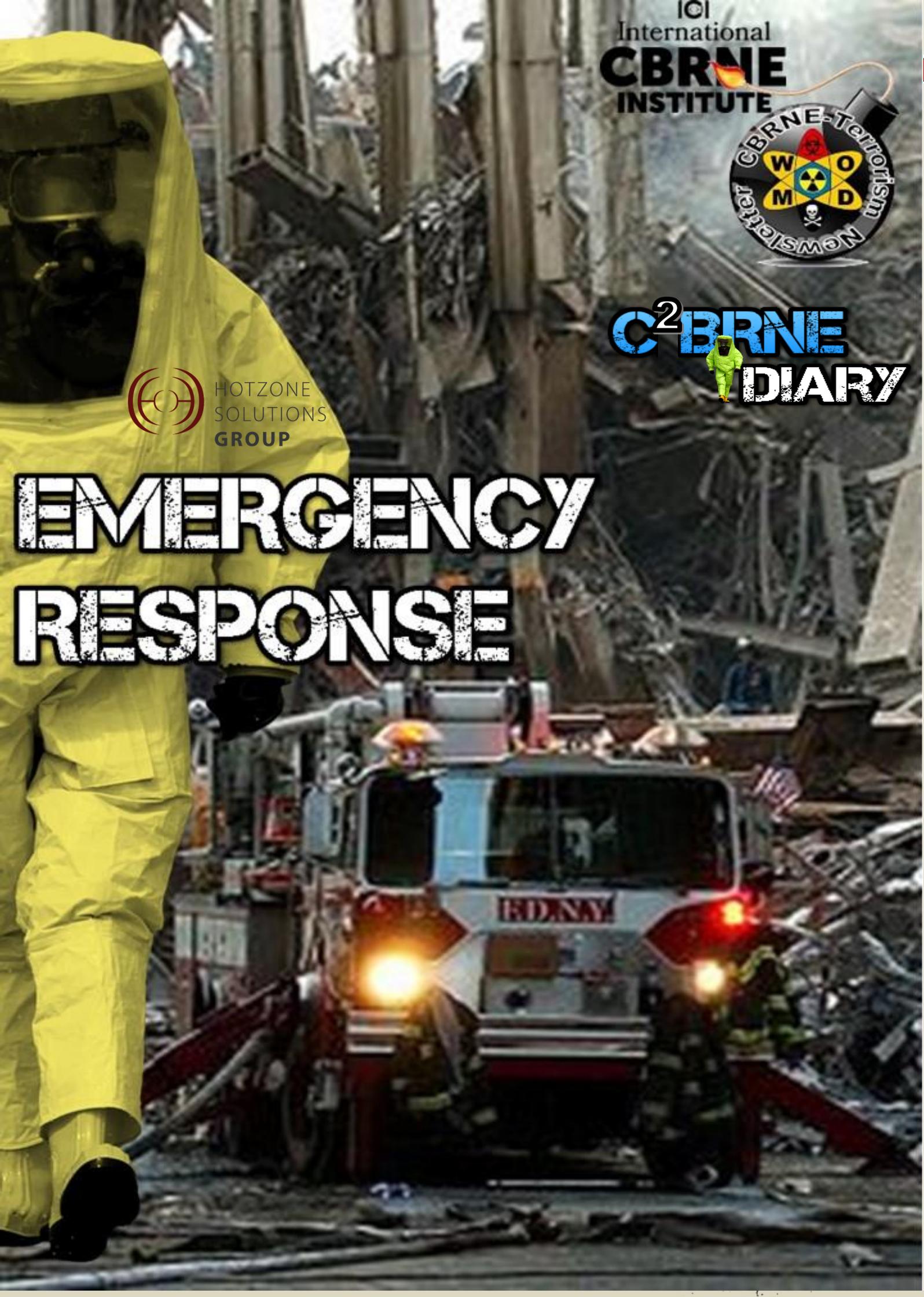
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EMERGENCY RESPONSE



Predicting Unprecedented Events

Source: <http://www.homelandsecuritynewswire.com/dr20200727-predicting-unprecedented-events>

July 27 – Coach Yogi Berra said that “It’s tough to make predictions, especially about the future,” but scientists have not given up on trying to do so. Researchers combined avalanche physics with ecosystem data to create a computational method for predicting extreme ecological events. The method may also have applications in economics and politics.



that fluctuations that happen in different biological species are statistically the same across different ecosystems,” said Samuel Bray, a research assistant in the lab of [Bo Wang](#), assistant professor of bioengineering at Stanford. “That suggests there are certain underlying universal processes that we can take advantage of in order to forecast this kind of extreme behavior.”

The forecasting method the researchers have developed, which was [detailed](#) recently in *PLOS Computational Biology*, is based on natural systems and could find use in health care and environmental research. It also has potential applications in disciplines outside ecology that have their own black swan events, such as economics and politics.

“This work is exciting because it’s a chance to take the knowledge and the computational tools that we’re building in the lab and use those to better understand – even predict or forecast – what happens in the world surrounding us,” said Wang, who is senior author of the paper. “It connects us to the bigger world.”

From Microbes to Avalanches

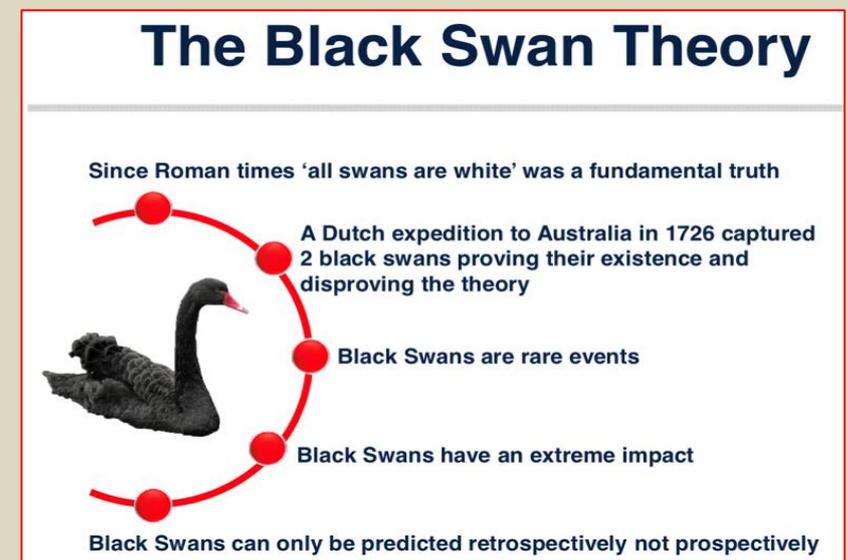
Over years of studying microbial communities, Bray noticed several instances where one species would undergo an unanticipated population boom, overtaking its neighbors. Discussing these events with Wang, they wondered whether this phenomenon occurred outside the lab as well and, if so, whether it could be predicted.

In order to address this question, the researchers had to find other biological systems that experience black swan events. The researchers needed details, not only about the black swan events themselves but also the context in which they occurred. So, they specifically sought ecosystems that scientists have been closely monitoring for many years.

“These data have to capture long periods of time and that’s hard to collect,” said Bray, who is lead author of the paper. “It’s much more than a PhD-worth of information. But that’s the only way you can see the spectra of these fluctuations at large scales.”

Bray settled on three eclectic datasets: an eight-year study of plankton from the Baltic Sea with species levels measured twice weekly; net carbon measurements from a deciduous broadleaf forest at Harvard University, gathered every 30 minutes since 1991; and measurements of barnacles, algae and mussels on the coast of New Zealand, taken monthly for over 20 years.

The researchers then analyzed these three datasets using theory about avalanches – physical fluctuations that, like black swan events, exhibit short-term, sudden, extreme behavior. At its core, this theory attempts to explain the physics of systems like avalanches, earthquakes, fire embers, or even crumpling candy wrappers, which all respond to external forces with discrete events of various magnitudes or sizes – a phenomenon scientists call “crackling noise.”



Built on the analysis, the researchers developed a method for predicting black swan events, one that is designed to be flexible across species and timespans, and able to work with data that are far less detailed and more complex than those used to develop it. "Existing methods rely on what we have seen to predict what might happen in the future, and that's why they tend to miss black swan events," said Wang. "But Sam's method is different in that it assumes we are only seeing part of the world. It extrapolates a little about what we're missing, and it turns out that helps tremendously in terms of prediction."

Forecasting in the Real World

The researchers tested their method using the three ecosystem datasets on which it was built. Using only fragments of each dataset – specifically fragments which contained the smallest fluctuations in the variable of interest – they were able to accurately predict extreme events that occurred in those systems.

They would like to expand the application of their method to other systems in which black swan events are also present, such as in economics, epidemiology, politics and physics. At present, the researchers are hoping to collaborate with field scientists and ecologists to apply their method to real-world situations where they could make a positive difference in the lives of other people and the planet.

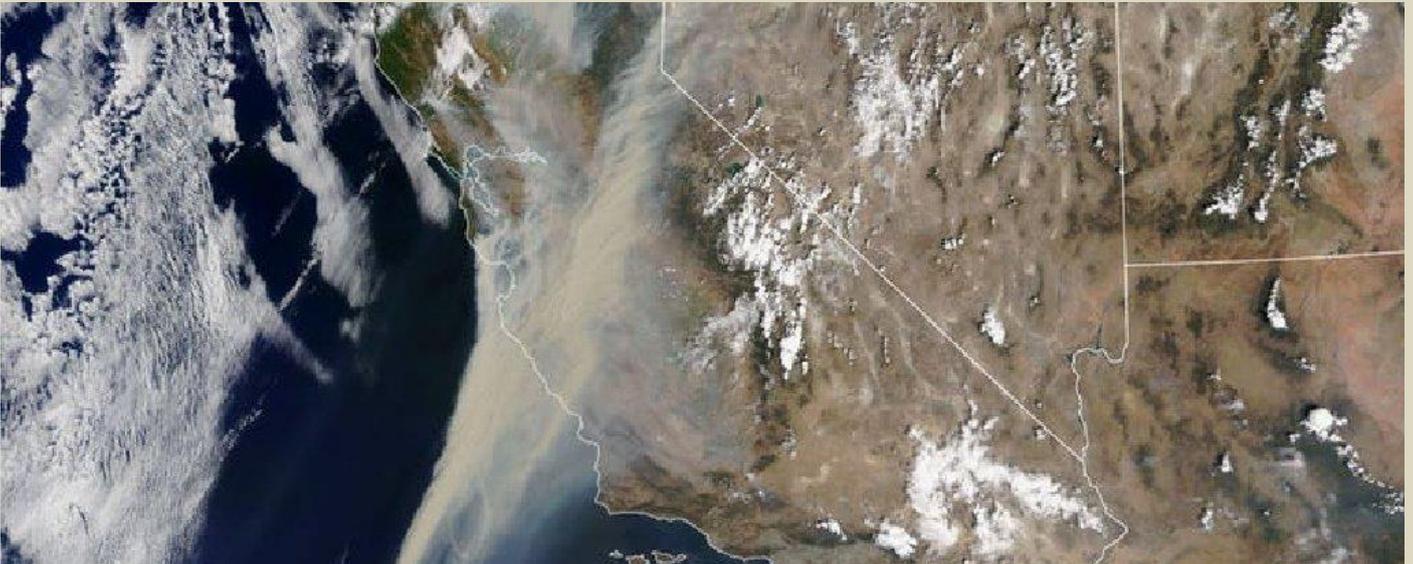
A new preparedness scenario to think of

A Covid hospital is hit by a blast caused by a nearby ammonium nitrate explosion and due to partial collapse, it is necessary to evacuate its highly infectious patients. This is not fiction! It happened (Aug 04) at Beirut's St. George Hospital. It can happen at your hospital as well. Because the unexpected always happens!

What's Actually in Wildfire Smoke, And Why Is It So Damaging for Your Lungs?

By Luke Montrose

Source: <https://www.sciencealert.com/what-s-actually-in-wildfire-smoke-and-why-is-it-so-damaging-for-your-lungs>



Smoke from Californian wildfires on 19 August 2020. (Lauren Dauphin/NASA Earth Observatory)

Aug 21 – If I dare to give the [coronavirus](#) credit for anything, I would say it has made people more conscious of the air they breathe. A friend texted me this week after going for a jog in the foothills near Boise, Idaho, writing: "My lungs are burning ... explain what's happening!!!"

A wildfire was burning to the east of town – one of dozens of fires that were sending smoke and ash through communities in [hot, dry western states](#). As [an environmental toxicologist](#), I research how air pollution, particularly wood smoke, impacts human health and disease.

I gave my friend the short answer: The state had issued a yellow, or moderate, air quality index warning due in part to wildfires. The high temperature for the day was expected to reach 100 degrees Fahrenheit, and it was already approaching 90.



[That combination of high temperatures and elevated levels of particles](#) from a fire can affect even healthy lungs. For someone with lung damage or respiratory illness, moderate levels of smoke particulate can [exacerbate respiratory problems](#).

That's only the start of the story of how wildfire smoke affects humans who breathe it. The rest, and how to stay healthy, is important to understand as the western wildfire season picks up.

What's in wildfire smoke?

[What exactly is in a wildfire's smoke](#) depends on a few key things: what's burning – grass, brush or trees; the temperature – is it flaming or just smoldering; and the distance between the person breathing the smoke and the fire producing it.

The distance affects the ability of smoke to "age," meaning to be acted upon by the sun and other chemicals in the air as it travels.

[Aging can make it more toxic](#). Importantly, large particles like what most people think of as ash do not typically travel that far from the fire, but small particles, or aerosols, can travel [across continents](#).

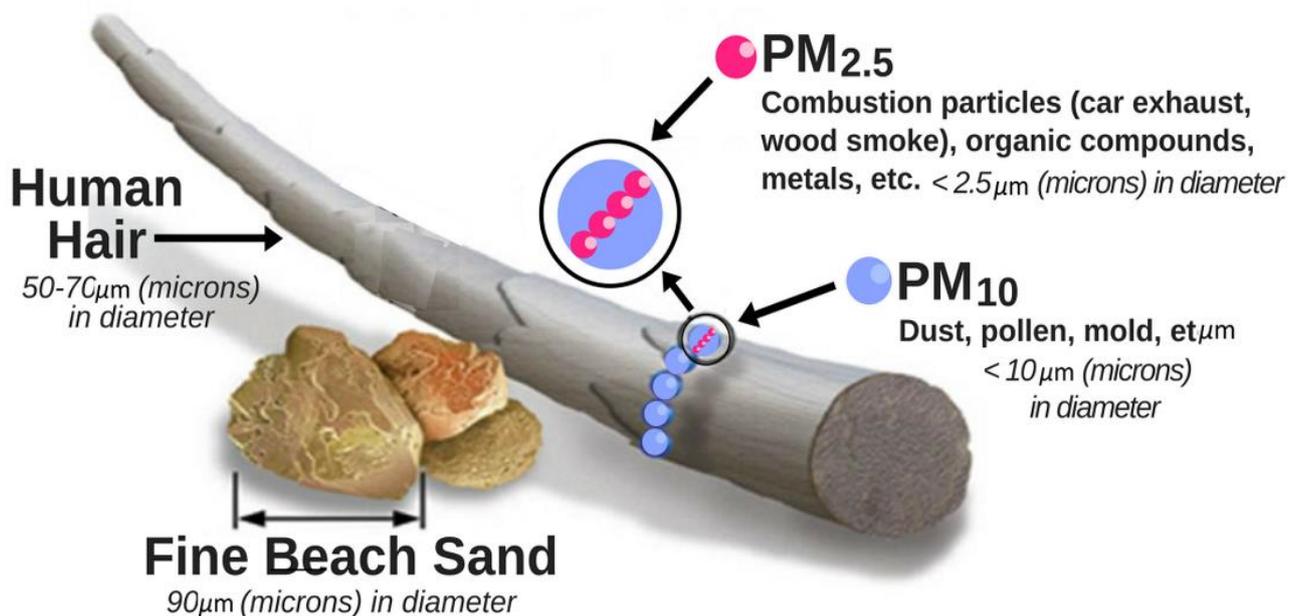
Smoke from wildfires contains [thousands of individual compounds](#), including carbon monoxide, volatile organic compounds (VOCs), carbon dioxide, hydrocarbons and nitrogen oxides.

The most prevalent pollutant by mass is particulate matter less than 2.5 micrometers in diameter, roughly 50 times smaller than a grain of sand. Its prevalence is one reason health authorities issue air quality warnings using PM2.5 as the metric.

What does that smoke do to human bodies?

There is another reason [PM2.5 is used to make health recommendations](#): It defines the cutoff for particles that can travel deep into the lungs and cause the most damage.

Relative Size of Particulate Matter

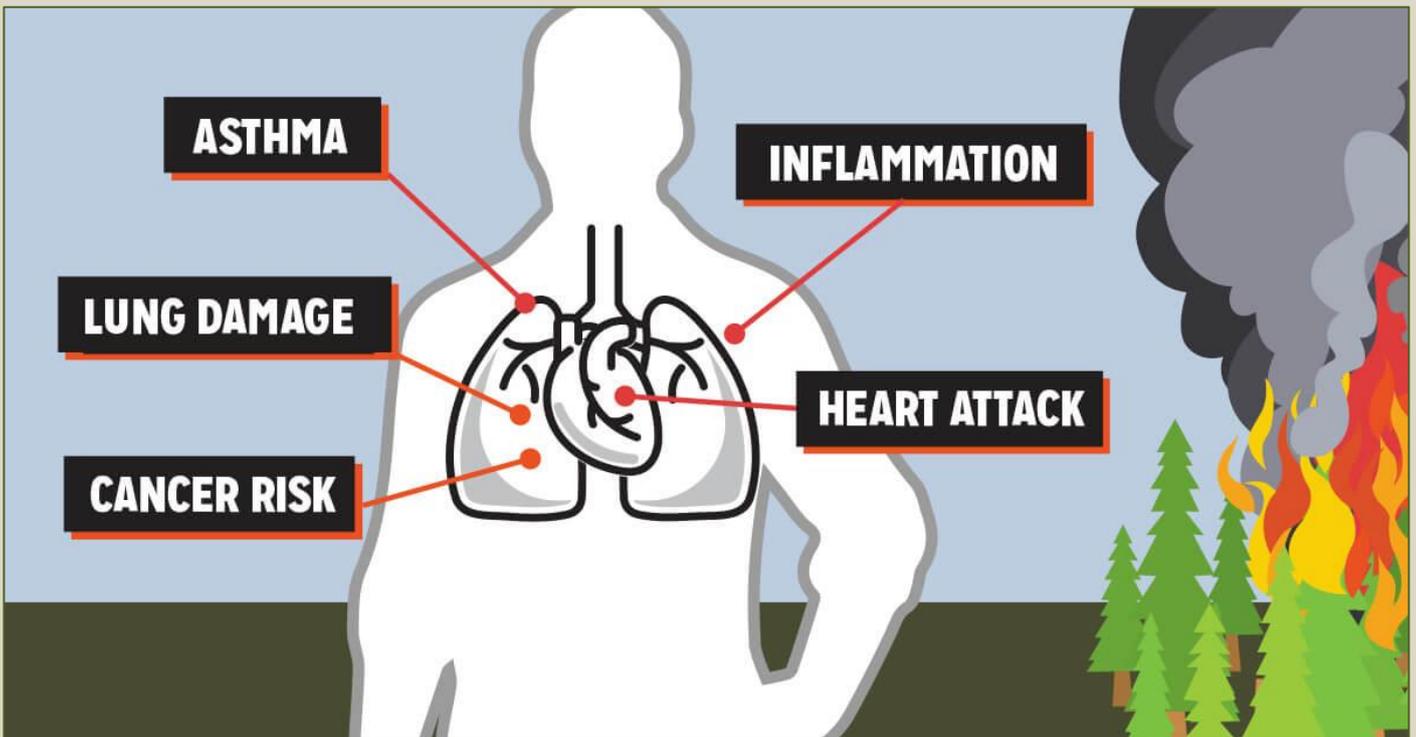


The human body is equipped with natural defense mechanisms against particles bigger than PM2.5. As I tell my students, if you have ever [coughed up phlegm](#) or blown your nose after being around a campfire and discovered black or brown mucus in the tissue, you have witnessed these mechanisms firsthand.

The really small particles bypass these defenses and disturb the air sacks where oxygen crosses over into the blood. Fortunately, we have specialized immune cells present in the air sacks called macrophages. It's their job to seek out foreign material and remove or destroy it.

However, [studies](#) have shown that repeated exposure to elevated levels of wood smoke can suppress macrophages, leading to increases in lung inflammation.





What does that mean for COVID-19 symptoms?

Dose, frequency and duration are important when it comes to smoke exposure. Short-term exposure can irritate the eyes and throat. Long-term exposure to wildfire smoke over days or weeks, or breathing in heavy smoke, can raise the risk of [lung damage](#) and may also contribute to [cardiovascular problems](#).

Considering that it is the macrophage's job to remove foreign material – including smoke particles and pathogens – it is reasonable to make a [connection](#) between smoke exposure and risk of viral infection.

Recent evidence suggests that long-term exposure to PM2.5 may make the coronavirus more deadly. A nationwide study found that even a small increase in PM2.5 from one US county to the next was associated with a [large increase in the death rate](#) from [COVID-19](#).

What can you do to stay healthy?

The advice I gave my friend who had been running while smoke was in the air applies to just about anyone downwind from a wildfire. Stay informed about air quality by identifying local resources for air quality alerts, information about active fires, and recommendations for better health practices.

If possible, avoid being outside or doing strenuous activity, like running or cycling, when there is an air quality warning for your area. Be aware that not all face masks protect against smoke particles. In the context of COVID-19, the best data currently suggests that a cloth mask benefits public health, especially for those around the mask wearer, but also to some extent [for the person wearing the mask](#).

However, most cloth masks will not capture small wood smoke particles. That requires an N95 mask in conjunction with fit testing for the mask and training in how to wear it. Without a proper fit, N95s do not work as well.

Establish a clean space. Some communities in western states have offered "clean spaces" programs that help people take refuge in buildings with clean air and air conditioning.

However, during the [pandemic](#), being in an enclosed space with others can create other health risks. At home, a person can create clean and cool spaces using a window air conditioner and a [portable air purifier](#).

[The EPA also advises](#) people to avoid anything that contributes to indoor air pollutants. That includes vacuuming that can stir up pollutants, as well as burning candles, firing up gas stoves and smoking.

Luke Montrose, Assistant Professor of Community and Environmental Health, Boise State University.



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ASYMMETRIC THREATS



A Global Flood Is Coming, And This Is What Scientists Expect It to Look Like

By Carly Cassella

Source: <https://www.sciencealert.com/a-global-flood-is-coming-and-this-is-what-scientists-expect-it-to-look-like>

July 31 – The perilous rise of our seas is pushing tides, waves and storms further inland from our shores - so much so, that in the coming century, scientists predict enormous swathes of land will be regularly inundated by water.

By 2100, if we have failed to put up defences and do nothing to curb our global emissions, new research has found coastal flooding could increase by nearly 50 percent.

"We are attempting to understand the magnitude of the global scale impacts of future coastal flooding," engineer Ian Young, from the University of Melbourne in Australia, [told](#) CNBC.

"Globally, we need to understand that changes of this nature will occur by 2100 and we need to plan how we are going to respond." With 600 million people living on coastlines less than 10 metres (32 ft) above sea level, even a steady rise in sea levels means leaving whole populations, homes, and infrastructure to the whims of the sea.

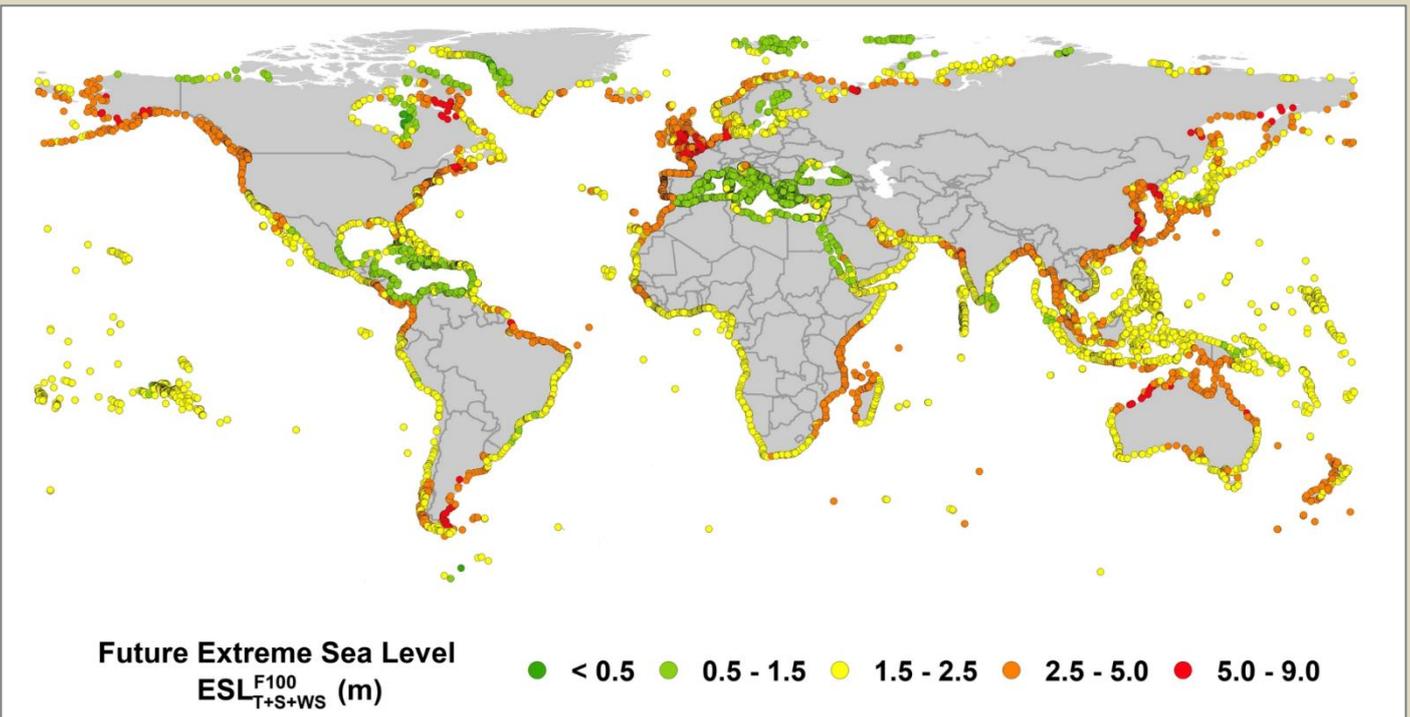
Under the worst-case scenario examined in the study, some 287 million people - 4 percent of the world's population - could be impacted by coastal flooding.

For those more inclined to think in dollars, this scenario threatens coastal assets worth roughly US\$14 trillion, or 20 percent of the global GDP.

Interestingly enough, most of that is from tide and storm events, which are creeping further inland and getting stirred up by [climate change](#). Only 32 percent is projected from regional sea level rise specifically.

"Even though average sea levels rise relatively slowly, we found that these other flooding risks like high tides, storm surge and breaking waves will become much more frequent and more intense," infrastructure engineer Ebru Kirezci, also from the University of Melbourne, [told](#) *The New York Times*.

"Those are important to consider."



Global distribution of projected extreme sea level in 2100. (Kirezci et al., *Scientific Reports*, 2020)

The model used is far from perfect, and the authors caution their findings do not accurately model local level predictions, but rather a broader global estimate. These estimates are based on coastal research from around the world, and they have been extensively validated against tide gauge data in both normal and more extreme conditions.



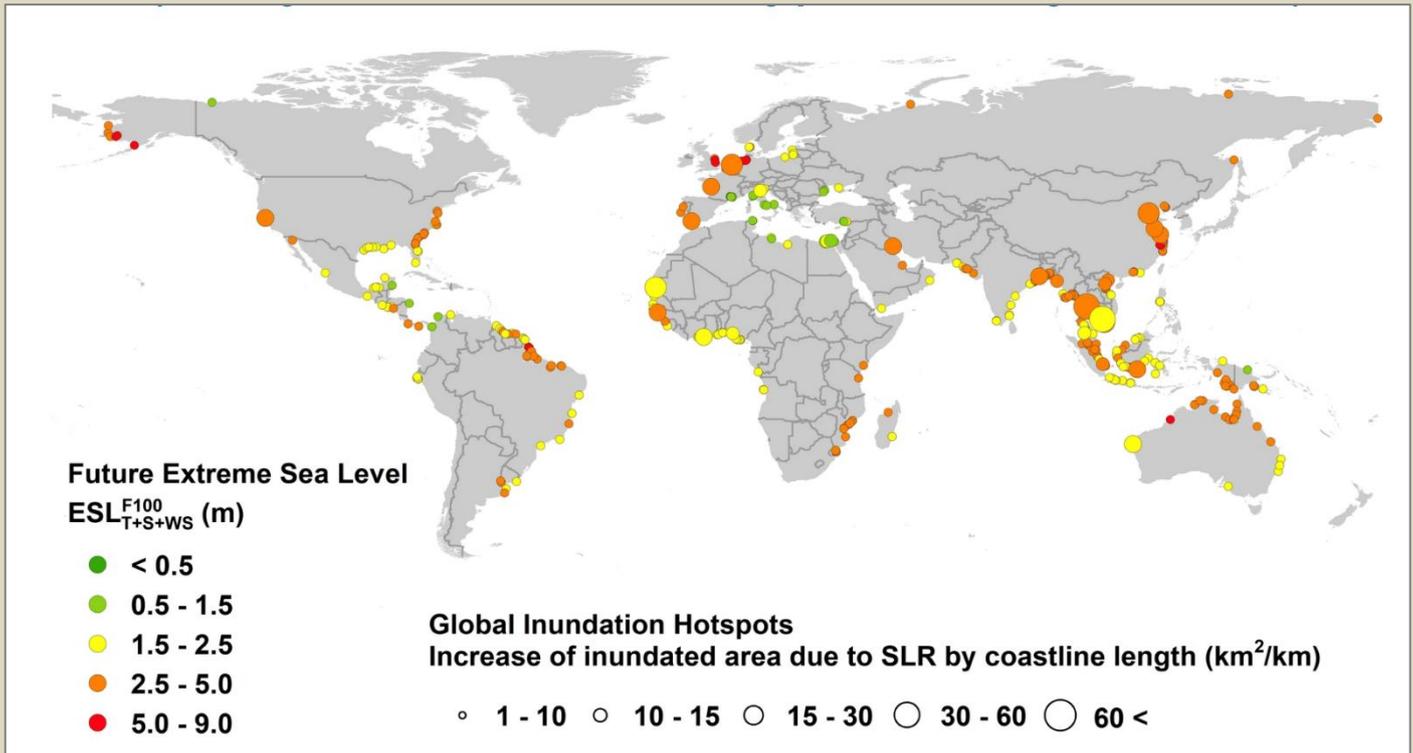
HZS C²BRNE DIARY – August 2020

Predicting the future is notoriously difficult, and when you consider the complexity of atmospheric and ocean systems at a global and regional level, it becomes all the more daunting. But giving it a go is also highly necessary when you consider the immensity of the crisis we are up against.

"Within the assumptions required to make such a global-scale study possible", the authors [claim](#) to have created a "first-pass" estimate of the global impacts of sea level rise.

More work needs to be done to tease out the details, especially on a regional level. That said, there are some parts of the world that already appear particularly vulnerable to episodes of flooding.

In the United States, these hotspots include North Carolina, Virginia and Maryland. In Europe, it includes the UK, northern France, and northern Germany. In Asia, it includes China, Bangladesh, West Bengal and parts of India. And in the global south, it includes Australia's Northern Territory.



Global "hotspot" regions for coastal flooding by 2100 under the extreme scenario. (Kirezci et al., *Scientific Reports*, 2020)

In the Pacific islands, where sea level rise poses a particularly existential threat, rising tides could actually [drown out fresh water supplies](#) by flooding the water table.

Unfortunately, at this point the world is locked in to a certain amount of sea level rise and climate change. And while we still have the opportunity and the time to seriously cut down on the damage it will wreak, we need to give these hotspots a head's up and a head's start if we want to prepare for the future.

Estimates like this give us the best chance of doing just that. Because if we don't plan for the worst, the worst will come, ready or not.

►► The study was published in [Scientific Reports](#).

