BLAIR: Okay, good morning everyone, delighted to be here, thank you for coming. And I look forward to having the opportunity to engage with you in conversation or Q&A later on.

A high-level American nuclear general said not long ago that the threat of a Russian nuclear attack against the United States was such a remote possibility, "That was hardly worth discussing." He added that, to him, "The greatest risk to my force is an accident, someone doing something stupid." Not only the United States but also the other eight countries that possess nuclear weapons run myriad risks every day of doing something stupid; risks of accidental detonations, of unauthorized launches, of mistaken launches based on faulty information or warning; of hostile encounters between opposing forces, ships, aircrafts, troops, encounters that spin out of control and spark conflict; and of lapses of security that result in nuclear weapons falling into the hands of terrorists, or other non-state actors. These are the very real risks, that are not that hypothetical and they are the grist for the mill of my talk this morning.

The problems are pretty obvious in the case of the U.S. and Russia, which you all know possess the vast majority of the world's nuclear weapons. There are some inconsistencies here between what the General says and what our actual nuclear posture on both sides is today. Because if deliberate nuclear aggression between them is hardly worth discussing, then why do the two sides keep thousands of nuclear warheads on hair-trigger alert, poised for immediate launch with a few strokes on a keyboard and pressing of the enter a few times. So these quick launch postures of the Unites States and Russia contradict the General's reassuring words -- although they are not all that reassuring, as I will note in a minute. Under these postures, the early warning teams on both sides receive sensor data every single day that needs to be urgently assessed as to whether this data represents a threat -- a nuclear threat to North America or to Russia.

They have to assess this information very urgently and once or twice every month, they have to take a second look because it looks a little worrisome. And on occasion the attack indications look very real and all hell breaks loose, and the crews freak out, and we are in the midst of a very serious false alarm that could lead much too easily to the use of nuclear weapons.

The process of decision-making from warning through decision to action is so fast that to me it's an accident waiting to happen. As the chief nuclear advisor to President Reagan put it in his memoir, "The scope of disaster is immense. In a matter of seconds for technical or human failure, mutual deterrence might thus collapse."
The Go code triggering a massive nuclear launch comes as a message -- it's very brief, it's the length of a tweet. Tweet in hand, U.S. underground crews can fire all the missiles under their control in the United States in 60 seconds -- I practiced this many hundreds of times when I served in the Strategic Air Command.

Believe it or not, Russia has shortened the launch time even more. They've automated the firing process, linking command posts in the Moscow area with missiles in the field, and it takes the top leadership in Moscow only 20 seconds to fire these missiles out of siloes as far away as Siberia, and that these rockets as well as American rockets are wired to launch as soon as they receive a code, a short stream of computer code, and these missiles don't care where the computer code comes from, whether it's from the President or a missile launch control officer underground, or from a hacker that manages to worm its way inside the launch circuits. As soon as they receive that code, they launch and that creates a potential cyber vulnerability of the first order -- I'll return to that in a bit.

At the same time, both sides today maintain plans to send this Go code, this tweet at the first signs of incoming warheads that are reported by the early warning sensors, satellites and ground radar. And under this plan, which we colloquially refer to as Launch on Warning, the decision process is extremely rushed. To prevent panic, it is pre-scripted and it is driven by a checklist and it is rote enacted. It is the rote enactment of a prepared script -- that's how I would describe it.

In some scenarios, after only about a three minute assessment of early warning data, a U.S. President could receive a briefing on his options and consequences from the commander of -- the strategic command in Omaha, in as little as 30 seconds because of the time pressure on this protocol. Then the President has roughly six minutes to choose an option. So clearly, this command system, it's rigged to fire, it's streamlined for speed, even light speed, not for deliberation, not for rational assessment, and it is obviously a cosmic gamble to operate these postures the way that we do.

And indeed, not surprisingly, we have come this close to disaster on several occasions on both sides. In one case, President Carter's national security advisor Zbigniew Brzezinski was seconds away from calling President Carter in the middle of the night, 3 a.m., to tell President Carter that we were under massive nuclear attack by the Soviet Union and he had to decide right away to choose an option for retaliation. Luckily Mr. Brzezinski got a third call in this protocol to tell him that it was a complete computer glitch compounded by human error.

A few years later, maybe three, a Russian early warning satellite mistook sun glint, reflections off the clouds, for U.S. missiles in flight and pushed Russia precariously close to launching on false warning. There have been really, probably a dozen close calls altogether, and it only takes one, one terrible false alarm to end civilization.

I have only begun to scratch the surface of human error in these control systems -- you may recall one of the more recent incidents that occurred was in 2007, when six nuclear cruise missiles, that had been stored at a U.S. base in North Dakota were loaded by mistake into a strategic bomber and flown across the country. No one knew the payload was nuclear, no one
knew the nukes went missing at the base. The pilots didn't know they were carrying nukes. No one had to sign any papers to take custody of them.

Going back a few years to the growing pain years of development of our arsenal in the '50s, '60s, there were at least 1,200 U.S. nuclear weapons involved in incidents of varying degrees of severity. Although the Russians don't advertise their accidents, their safety records are clearly as bad as and probably much worse than ours, with nuclear forces crashing to earth and sinking to the bottom of the oceans.

This isn't ancient history; between 2009 and 2015, the Air Force alone, U.S. Air Force experienced 1,300 incidents known as Dull Swords involving nuclear weapon systems. On the Russian side, it wasn't that long ago that one of its ballistic missile submarines caught fire in port and burned out of control for over a day, while carrying a full load of nuclear weapons.

These are the kinds of problems that are not confined to the United States and Russia; they exist everywhere. Human frailty and propensity to do stupid things are universal, and they are probably far worse in the other nuclear weapons countries. Most of them are up to a century behind, at-least two decades or so, behind the United States and Russia in terms of safety and safeguards.

Things like one-point safety, fire-resistant plutonium pits, and sensitive high explosives and PALs, Permissive Action Links, designed to prevent unauthorized launches. These countries are just not up to speed in this department and they are running even higher risks than we are for doing something stupid that would result in a nuclear detonation or in weapons being captured.

I'll go back to Pakistan -- you've heard a lot about the geopolitics, let me just note a couple of technical points of interests. It has the fastest growing nuclear arsenal in the world, and as was pointed out, it has a '50s era doctrine of the early first use of nuclear weapons during a crisis with India. And it's currently planning to increase the combat readiness of its nuclear forces in peace time and certainly during a crisis.

At the same time, its weapons are unsafe and they are in the hands of the military with significant jihadist sympathies within the ranks. If the Pakistani nuclear weapon were dropped from an airplane today, or if the Taliban lobbed a mortar, a conventional mortar, into the Pakistani nuclear weapons storage depot, the weapons may well detonate for lack of these safety devices, with yields in the league of the Hiroshima bomb. And yet despite these risks, we are seeing militaries around the world lobbying to increase the alert levels and combat readiness of their nuclear forces. They are relying more on nuclear weapons in their strategy and they are lowering the threshold for the intentional use of their weapons.

As I said, Pakistan plans to use them first and early, but so does Russia. Russia's strategy includes a tactic they called de-escalatory escalation, which means that they would resort to the early use of tactical weapons in a conventional conflict in order to shock the opponent into standing down.

China and India today formally subscribe to a policy of no first use of nuclear weapons but that may be beginning to slip away, the internal debates
within both of these countries suggesting the potential abandonment of this policy in the future.

We are going to run through a few trends in all of these countries that I think are relevant to the topic at hand, both U.S. and Russia: flash points and accidental nuclear war.

Russia is now deploying nuclear weapons in their annexed territory of Crimea. It will soon deploy death trains, trains that carry strategic missiles. It's deploying a new ground launch missile in violation of the treaty banning it. And it has a host of other really weird weapons in the pipeline, including one you may have heard about that slipped into the press about a year or so ago -- a long-range nuclear torpedo that can travel underwater across oceans, thousands of miles to deliver a high-yield nuclear weapon to an adversary's port like the Port of Los Angeles or Baltimore or New York, produce a yield that destroys the port and generates a radioactive tsunami whose purpose is to ground, basically ground the urbanites living in the adjacent cities to the ports. How mad can things get?

So China, I have to say some good things about China. It has been really a model of restraint in nuclear weapons for 50 some years, deploying a small, relatively small arsenal and keeping virtually its entire arsenal in storage in peace time, which minimizes the risks that I have been describing of accidental or unauthorized detonations or weapons falling into the wrong hands.

But again, I worry about trends for the future and I see a distinct possibility that this restraint may not last. China is deploying its first strategic submarines and now also land mobile rockets and its military is lobbying to put these weapons on higher alert and to mate warheads previously in storage to these delivery systems when they put them on patrol even in peace time.

The strategic command of China wants its President Xi Jinping to be outfitted with a nuclear suitcase in order for the Chinese president be able to expedite the launch authorization of Chinese forces. And in furtherance of this sort of mindset of being ready to use nuclear weapons quickly, China is developing an early warning satellite that in principle could support a policy of launch on warning.

India is sort of up to similar tricks. It's rounding out a triad of nuclear weapons, and its nuclear establishment is pressing hard to operationalize its force to take weapons out of storage and put them in the field. And in furtherance of this sort of mindset, its Prime Minister, Modi, has also been given a nuclear suitcase that is linked to dedicated satellite circuits with Indian nuclear forces so that he can expedite the use of nuclear weapons. Similar pressures for all of this, as I said, are building across the board, including in Pakistan and in India.

North Korea, two points. We all know that they are weaponizing. They are going gangbusters to build nuclear bombs and to be in a position to be able to deliver those bombs on shorter and shorter notice. And if and when this army occurs, we're on the brink of it, the Korean peninsula is going to be a conflict waiting to happen and an accident waiting to happen.
The second point about North Korea reminds us all that leaders with fingers on a nuclear button are fallible and sometimes they act recklessly and in a delusional way, and Mr. Kim is not alone in this category. Is he?

So let me end with just a quick snapshot of Israel, which is deploying into the Persian Gulf strategic submarines capable of delivering nuclear armed cruise missiles, and depending on evolving threats in the region, namely primarily Iran's program, it may begin to establish regular sea-based patrols of nuclear weapons.

All of these risks in all of these countries are run in the name of deterrence, and they are much greater than our governments like to admit to their publics. They're often hidden from public view, even in the democracies. The United States didn't put locking devices on its strategic submarines until 1977. We've ostensibly pre-delegated Presidential launch authority to military generals and admirals throughout the Cold War.

We did lots of other things that I won't bore you with at this point. But many of these facts have been completely shrouded in secrecy in the United States. Nuclear weapons escape the control of the democratic process in the United States, and not only control of the public and the Congress, but even Presidents have been kept very much in the dark about a lot of the truths about these risks.

Now, to cyber war, which I think is emerging as one of the most worrisome developments in this entire arena. Questions here abound -- could unauthorized state or non-state actors spoof early-warning networks and generate a false alarm that triggers the mistaken launch of nuclear weapons? Could hackers breach the firewalls and actually transmit launch orders to the crews or directly even to these missiles that are just waiting for a short stream of computer code? What if an insider colluded with outsiders to provide passwords and access to the launch circuits? This really is the nightmare scenario. It's the insider that helps the outsiders.

A few years ago, the Head of the U.S. Strategic Nuclear Forces testified to the U.S. Congress that they hadn't done a comprehensive assessment of the vulnerability of U.S. nuclear forces to cyber attack, and it's urgent. It needs to be done. He said, "We don't know what we don't know." "Like what?" "Well, like one of the things, we still don't know whether our critical nuclear command, control and communications and early-warning computers have already been infected by malware that an adversary could activate at a time of its choosing.

We don't know whether our critical nuclear command systems have been infected by malware because we've lost control over the whole chain of supply. We're using off-the-shelf equipment. Some of it from China, from other countries. We have no control from the moment of design through manufacture, distribution, installation and operation of both hardware and software. And so what would we do? Our military weighs the use of this critical equipment. We have to have our weapons on alert and be usable, but we can't certify that our systems are bug-free. So what do you do? You wave the problem away."

Now, other countries have the same problems, and we know even less about that. So that's a given. But I would just ask you, I mean, think about it. Given how little we know about this threat in our country and in other countries, is it sane really, is it sensible to keep our weapons on
launch-ready alert, ready to be fired as soon as it gets the short stream of computer code? No. It doesn't make any sense. It's a danger. It's an unauthorized launch waiting to happen.

So let me wind down here with a brief discussion of the risk of escalation that results from operational interactions between nuclear adversaries. And here I’ll be focusing primarily on the flash point of the U.S., NATO and Russia relationship but it applies around the world. It was mainly a Cold War concern, but it's been revived as the parties to these disputes, intend to resort again to post-Cold War brinksmanship, as the United States and Russia to a considerable degree are doing today -- I thank Jessica Sleight, my intrepid colleague for putting together a couple of slides that we'll show you in a minute.

During the Cold War, this was common place. I practiced -- I was involved in nuclear brinksmanship myself once in a serious way during a Middle East crisis when the White House through the Pentagon ordered me -- while I was in an underground launch control center in Montana to prepare to fire up to 50 intercontinental missiles aimed at Russia and China. And I did so. We got a message, decoded it, and it ordered us to get ready to fire. We opened our safes, we took out our launch keys and launch codes. We put them right next to us at our console, and we strapped into our launch chairs to brace for an imminent nuclear explosion because that was the procedure, that's the protocol to get ready for nuclear war.

And the whole point of it, and this was a decision made not by President Nixon who was retired for the night, inebriated, in the middle of the Watergate scandal, but rather by unelected officials who were members of Nixon's cabinet, James Schlesinger, Henry Kissinger and others. Their aim was to warn Russia that they had better back down in this clash during the Middle East war or else face an escalating risk of nuclear war, not so much caused by premeditated decision and aggression as by events just spinning out of control.

And so, again, we, NATO and Russia are reengaging in similar kinds of provocative activities, activities that could too easily escalate out of control. The close encounters between Russian and Western military aircraft have spiked over the recent years. NATO fighters have intercepted Russian aircraft hundreds of times each year over the last several years.

Russian war planes have also engaged in muscular interdiction. And in one instance, Russian aircraft forced a U.S. spy plane to flee into Swedish territory in order to escape harassment by the Russian fighters. So here's a slide that Jessica has put together that shows 331 incidents involving these parties over the past three years -- 331 around the world, involving the U.S., NATO and Russia. This is just to give you kind of an impression of the extent and diversity of these incidents.

The next slide will show you the many hundreds of air incidents that have occurred between these parties. These were air incidents they've been concentrated in the Baltic area. And 56 percent of all these air incidents have taken place in the Baltics.

Now, this is -- this is the reversion to sort of Cold War harassment, intimidations, shouldering of ships, buzzing of ships, buzzing of aircraft, and it's not a full-blown crisis, but it puts the two sides at the
lower rungs of a sort of low-boiling security dilemma of action/reaction that is creating additional tensions and moving them up the ladder of escalation.

It's a slippery slope. There are risk-takers in the game. We all know that. And I think we are pushing the risk of deliberate or inadvertent escalation to a level that is getting to look quite worrisome. Don't underestimate the chances of someone doing something really stupid in a situation like this that leads to the belligerence to blunder into a shooting conflict that could lead to escalation that gets out of hand.

Let me wrap up by just noting, of course -- the next session will make this point in spades, but just one nuclear weapon exploded in an urban area could kill a million people easily. And that's why shrinking the arsenals alone isn't enough. We have to get rid of them entirely, all of them, if we wish to drive the risk of a humanitarian catastrophe down to zero.

I was in a session earlier this week of Americans and Russians that come out of the old school of thinking and when I made the point to them, there were howls of protest of course because to them, if we eliminate nuclear weapons, if we remove countries from the threat of nuclear devastation and of annihilation, they believe that this loss of extreme vulnerability of populations would mean a loss of stability.

To the traditional sort of conventional mind, we have to threaten annihilation in order to keep the peace. And my response to that is, as I'm sure your response is as well, is that this is not only morally bankrupt, it's a recipe for disaster. If we don't eliminate nuclear weapons in our lifetime, I'm convinced -- based on everything I've just said and other things, I'm convinced that they will be used during our lifetime, either on purpose or by accident.

Thank you.