NUCLEAR WEAPONS AND HUMAN SURVIVAL

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That nuclear weapons are in some sense a more or less immediate threat to human survival has been a commonplace since 1945, is diplomatic 'boilerplate' for a number of delegations – a standard phrase often uttered without much thought as to exactly what it means – and has now received new currency with the 2006-2007 reworking of the 'nuclear winter' hypothesis of the 1980s by Toon, Robock, et al.

The International Commission on Nuclear Non-proliferation and Disarmament (ICNND)
observes that:
“Nuclear weapons are the most inhumane weapons ever concieved, inherently indiscriminate in those they kill and maim, and with an impact deadly for decades. Their use by anyone at any time whether by accident, miscalculation or design, would be catastrophic. They are the only weapons ever invented that have the capacity to wholly destroy life on this planet, and the arsenals we now possess – combining their blast radiation, and potential 'nuclear winter' effects – are able to do so many times over. Climate change may be the global policy issue that has captured most attention in the last decade, but the problem of nuclear weapons is at least its equal in terms of gravity -and much more immediate in its potential impact.” [1]

While Jonathan Schell, writing back in the early 1980s, noted that:
“The widespread belief that a nuclear holocaust would in some sense bring about the end of the world has been reflected in the pronouncements of both American and Soviet leaders in the years since the invention of nuclear weapons”.[2]

Of more immediate salience to an NPT Prepcom audience is Ambassador Benno Laggner's statement on behalf of 16 governments (repeated in October during UN First Committee on behalf of 32 governments) in which he stated that:
“Nuclear weapons have the destructive capacity to pose a threat to the survival of humanity, and, as long as they continue to exist, the threat to humanity will remain....moreover it is of great concern that even after the end of the cold war, the threat of nuclear

annihilation remains part of the 21stcentury international security environment." [3]

I cannot commend this statement (the full text of it – available on Reaching Critical Will) too strongly, nor the way in which the Swiss Government, along with a small number of other middle – sized governments, have pressed for nuclear disarmament in venues such as this one.

The governments of nuclear weapons states on the other hand, together unfortunately with a number of their allies including shamefully my own country, Australia, have simply refused to engage with the revived 'Nuclear Winter' hypothesis, and have characterised the emphasis on 'Catastrophic Humanitarian Consequences 'led by Ambassador Laggner and other governments, as 'unhelpful'.

This is itself profoundly unhelpful! Moving the debate on nuclear disarmament into the 'Catastrophic Humanitarian Consequences' and 'Human Survival' corner is precisely what is required to force the nuclear weapons states to confront the real consequences of the use of these devices. Human survival is a concern that rightly trumps all other earthly concerns. And it happens to be valid. Nuclear weapons are indeed, a clear and present danger to the survival of humans as a species. Governments, especially NWS, must change their policies in recognition of this overwhelmingly important consideration.

States other than the NWS have of course been sufficiently motivated for 120 of them to have attended the conference in Oslo devoted to the Catastrophic Consequences of Nuclear Weapons Use, and the Oslo conference has done much to move the debate in the right direction.

The key questions I want to ask in this paper – articulated most poignantly for me by Colonel Valery Yarynich exactly a year ago, before he died in Moscow on 13 December last year at a plasticky bar in Praterstern Railway Station in Vienna as we attended the 2012 Prepcom – are:

1) Just what are the probabilities of an accidental apocalypse taking place: (a) under current nuclear postures and practices; (b) under presumably safer alternative postures (such as a de-alerted posture), over, say, the next 20 or 50 years?

2) Just how likely is it that large-scale nuclear weapons use, should it take place, would permanently (or for centuries) destroy what we call civilisation?

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3) Just how likely is it that such an exchange would terminate not merely 'civilisation', but would actually be completely 'terminal' for humans as well as, of course, countless other species?

Is it possible actually to put a number on the risk of human extinction that on-alert nuclear weapons pose, and is it possible to compare that number with another number – say for de-alerted nuclear weapons, and yet another for no weapons at all? [4]

This is an enormously worthy, but probably impossible, project which should nonetheless be attempted. This is because even our 'unsuccessful' attempts tell us enormously useful things – such as that, while the 'numbers' part may turn out to be unquantifiable, on-alert is much more dangerous than off-alert, and that the real threat to human survival lies in superpower arsenals rather than terrorist ones or in so-called 'rogue' states. And it is a project that in the next few pages I am going to completely fail to achieve, in part because I lack the mathematical skills, but primarily for the reasons I outline below. I hope, however, that I fail instructively, and that my failure nonetheless tells us something about the nature of the risks nuclear weapons pose to human survival and about what we might do to diminish or eliminate those risks.

Just how likely that large-scale nuclear weapons use could indeed be 'terminal'-- for humans as a species--and just how seriously should policymakers take such a possibility? Above all what should they DO about it?

Just how should the possibility of actual human extinction be differentiated from slightly less cosmic eventualities such as the mere end of latter-day consumerist capitalism via the disappearance of the global financial system, (possibly achievable by hackers without even one warhead), certainly achievable with a little more damage to infrastructure by less than a dozen largish warheads exploded in space – or even perhaps, by intense solar flare activity...?

Should an end to humans be differentiated from the destruction of MOST cities, (followed by prolonged darkness and cold), but in which some humans somehow survive on islands in the far southern oceans in New Zealand, Tasmania, and Patagonia?

Schell as usual has an inimitable phrase for just what difference it makes: “The destruction of human civilisation even without the biological destruction of the human species, may perhaps rightly be called the end of the world, since it would be the end of that sum of cultural achievements and human relationships which constitutes what many

people mean when they speak of 'the world'. The biological destruction of mankind would of course be the end of the world in a stricter sense."[5]

A 2008 article in the Bulletin of the Atomic Scientists [6] provocatively titled 'How can we reduce the risk of Human Extinction?', has a rather consequential 'to do' list that includes watching briefs on nanotechnology and biotech and on physics experiments that might possibly cause the entire solar system to disappear in a flash of exotic particles, on large incoming asteroids – and at the top of the list, to lower the operational readiness of nuclear weapons systems and then to abolish nuclear weapons.

But as we've already seen, nuclear – weapons states governments avoid talking of nuclear abolition, (or lowering operational readiness) as a 'human survival priority', though recently the principal NGOs in the abolition movement circulated to the US Congress and Russian Duma a letter authored by myself and others urging those governments to do just exactly that. Some of you will have seen that letter. In it, we say to the Duma and Congress that:
"The undersigned write to you to urge you to prioritise nuclear weapons abolition as a human survival imperative"
"The Congress and Duma need to debate and factor into security doctrines the catastrophic humanitarian consequences of large-scale nuclear weapons use, now the subject of a number of multilateral statements at the United Nations and of an international meeting in Oslo in March. These matters, of existential importance to the rest of the world, have never to our knowledge been discussed in the Duma or Congress." [7]

And while the NWS continue to avoid talking in human survival terms, other governments, notably the 120 represented in Oslo, have talked in those terms for so long that in for a such as First Committee, it's seen as uncontroversial but unexamined and routine, 'boilerplate' – ritualised language that somehow is expected to be there, but has lost some of its impact. Yet this language, repeated at prepcom after prepcom, First Committee after First Committee, is all too literally true and all too much- to-the-point. It is truer than we know, and hopefully Oslo has put new life into it.

A number of authors have in fact tried to arrive at actual probabilities, not for human survival/non-survival as such, but for the probability of an (accidental or otherwise) large-scale use of nuclear weapons. Analyses have been done by Barrett, Baum and Hostetler , Martin Hellman, and Col. Valery Yarynich, the latter as an appendix to the 'smaller and safer' article in Foreign Affairs with Blair,

Esin, McKinzie and others.

It is then possible on the basis of these analyses to move toward what Colonel Valery envisaged in that cafe in Praterstern by asking/answering questions about warhead numbers and targeting that lead to conclusions about city burning, nature of firestorms (and how many firestorms and where, fuelled by what), that in turn lead to conclusions as to how many million tonnes of soot generated, injected how far into the stratosphere at what temperatures, which in turn lead to conclusions as to the exact global climatic consequences of what has been done – How dark, how cold, and for how long?

Barrett, Baum and Hostetler's analysis of the steps toward inadvertent nuclear war is perhaps the most illuminating as they actually go step-by-step through the sequence that leads to such an outcome, and while their attempts to provide numbers are beyond my limited math, and may be attempts to quantify the unquantifiable, the exercise remains worth doing because it does at least establish rough bounds for risk, and because it disentangles what must be known in order to evaluate that risk and what factors affect it. [8]

Barrett, Baum and Hostetler [9] examine the likelihood that false data and false indications from highly automated satellite surveillance systems operated by Russia and the US might lead decision-makers mistakenly to launch a salvo of missiles (which would mean round 1000-1500 warheads) at the other party, in the belief that the other party has launched theirs, and that they must 'use them or lose them'. Taking missiles off high alert simply removes this as an option. However its presence as an option mandates the taking of decisions (even if the decision is to take no action), in highly compressed timeframes and – worse - biases the decision toward a launch.

Barrett, Baum and Hostetler look at these probabilities (a) outside a specific crisis and (b) during a crisis such as the Cuban Missile Crisis. They also try to arrive at probabilities for crises.

So far, so good. However already a couple of conceptual problems are starting to arise, namely that it's hard to define exactly what might be meant by a 'crisis' (there has been only one Cuban Missile Crisis, but many other crises that are quite different in structure from the CMTC), and in fact, most of the documented 'near misses' have in fact taken place quite outside any formally defined 'crisis' yet they have been no less perilous.

The numerous US computer incidents, Colonel Stan Petrov's brush with the apocalypse at Serpukhov-15 on 26Sept 1983, and the 1995 Norwegian

Weather Research Rocket incident all took place outside any specific confrontation or crisis,(though Col Stan's incident was close to the Able Archer exercise and in a period of very high tension) yet any one of them could all too easily have gone to a resolution that was completely terminal.

Barrett, Baum and Hostetler do I think, partly cover themselves by working with the probability of accidental nuclear war 'during a crisis' and then 'outside a crisis', but I suspect that the argument just traversed may lead to much HIGHER numbers than we assume, for the likelihood of an inadvertent apocalypse OUTSIDE a specifically – defined crisis. It may also mean that the little box on Barrett, Baum and Hostetler's flowchart that asks whether or not there is a crisis may be rather less important and meaningful than at first appears.

Prof. Martin Hellman similarly, tries to ask 'what is the likelihood of a Cuban Missile Crisis Type Event?', when this question, while not entirely without utility is much less meaningful and much less crucial than it at first seems – both because of the aforesaid difficulty in defining a 'CMTC event' adequately and again, because so many of the truly terrifying near misses took place absent any specific crisis. This definitional question becomes even more important, as one of Barrett, Baum and Hostetler's modelling options is to 'exclude launch response in a non-crisis'. Barrett, Baum and Hostetler are wise to set more store on the model that does not do this, as it would lead to serious underestimates of inadvertent launch probabilities.

Barrett, Baum and Hostetler [10] make use of what may be a much more useful rule of thumb, when they suggest that the likelihood of an accidental apocalypse (i.e. the launch of 1000+ warheads based on misinformation) depends on the likelihood of false data about the status of the 'other sides' weapon systems (false indications of a launch especially) being taken seriously, and being taken up the chain of missile assessment conferences right to the point at which a commander in chief is woken at 3am with a request for an order to launch after a 30 second briefing and with 3 minutes to make a decision.

I have no idea how it is possible even in principle to assign numerical values to what will come out of that, but note that the entire process is heavily though maybe not irrevocably, biased in favour of a decision to launch. However both Barrett, Baum and Hostetler's step-by-step through the process, and Hellmans rough estimates of the probability of a 'CMTC-Type event' at least force one to think in a disciplined way about it, and maybe it is possible to use these

complementary approaches to establish upper and lower bounds. Both Barrett, Baum and Hostetler and Hellman do however in my view lay too much stress on the idea of a 'crisis', when that concept both lacks adequate definition and when so may perilous events clearly took place outside a 'crisis'. It would be better to focus analysis on the specific events themselves.

Lets look at a few obvious things.

--In the last 65 years, there has been just one CMTC event, in which, for roughly 3 weeks, the likelihood of 2-300 x 1Mt nuclear weapons use by the US and Russia seemed to be 'between one in three and even'. In fact however, unknown to the 'between one in three and even' estimate, a number of sub – events, in one of which a nuclear – armed torpedo was nearly fired at a US warship by a submarine that was being depth-charged, and in another of which the scramble alarm at a US airbase hosting nuclear – armed fighter bombers was set off by a bear, took place. In each case the world was saved by specific individuals – by a base commander who sat on the main runway in his jeep blipping his headlights, and by the refusal of one of three persons needed to authorise use of a nuclear torpedo to do so.

--Would the 'Able Archer' exercise of the end of 1983, in which NATO leaders practiced for WWIII, constitute a 'crisis'? The Soviet leadership viewed Able Archer as a possible opening of a NATO nuclear attack – a 'splendid first strike' on Russia, and plans for Able Archer were changed at the last moment in view of intelligence reports to that effect. Intelligence by a Soviet 'mole' within NATO also helped convince the Soviets that in fact armageddon was NOT in the immediate offing. Colonel Stan Petrov's brush with armageddon the previous month also probably helped to induce a salutary caution. But how to quantify any of that??? These are specific events involving specific people, some of whom (Col Petrov) are well able to talk about what made them decide as they did decide.

--There have been an unknown (because all US events from 1985 have been classified) number of events that took place quite independently of any specific crisis, but any one of which could easily have been terminal.

During those events, nuclear – armed fighter-bombers were taxied to the edges of runways with motors running, minuteman crews were ordered to be launch-ready, and the 'doomsday plane' (NEACP) was launched. In both the US and Russia, sirens have wailed, lights flashed, and people have shouted in panic across nuclear command centres.

The Post '85 US classification prevents us from getting a proper contemporary perspective on US events and paradoxically we know more about what has happened in Russia. A possible guesstimate for the number of these events might be 20-40 (???). But it's a guesstimate, a wild extrapolation, where what we really need is definite knowledge.

A selection follows of some events that we do know:

-Colonel Stanislav Petrov's 'brush with the apocalypse', the September 26 1983 Serpukhov-15 incident, in which an unusual formation of vertical clouds directly over US launch sites in North Dakota with the sun at 180 degrees looked exactly like a launch to the sideways looking (the Soviets were immensely proud of that) surveillance satellite. Colonel Stan literally saved the world by not initiating a launch sequence because 'I had a feeling in my gut that there was a mistake somewhere'.

How to assign a probability to the gut feeling of a respected and highly competent Russian colonel who is experiencing the most stress a human can endure, and who against all odds makes the right decision? Humanity owes this man an enormous debt. The 'Divine Providence' school of explanation would gleefully cite the fact that Col Stan wasn't even supposed to be on duty that day but had swapped his shift with an officer junior to him, who being more junior, would have 'gone by the book', and we would not be here to talk about it.[11]

Another major brush was the Norwegian Weather Research Rocket incident of 1995. Essentially the story is that the Norwegians launched a weather research rocket to study the Aurora Borealis, that just happened to consist of a secondhand first stage of a US ICBM. A letter was sent from the Norwegian ministry of science to Russia's ministry of defence, but it never got to Russian perimeter radar, who did exactly as they were trained to do and assumed it was a submarine – launched US missile, that would either vaporise the Kremlin or else explode in space above european Russia and take them back to medieval times with electromagnetic pulse.

Boris Yeltsin was thus awakened at whatever ungodly hour it was, and (so I understand) an unknown aide uttered the immortal words 'excuse me Mr President, let's wait another minute' (beyond the deadline when they were supposed to enter a command to launch). This was agreed to and the rocket plunged into the arctic ocean just exactly as the fax from the Norwegian ministry of science (that no -one relevant had read) said it was supposed to. Everyone exhale.

Again, how to assign a number to that? All one can do is to learn as much as possible about what actually did take place.

Still other incidents, this time in the US and released before 1985, include a fault in a chip in a switching station in Colorado that had the main combat computer indicating 'thousands' of incoming Soviet missiles. This happened over an 18 month period three times, and each time, nuclear armed fighter bombers were taxied to the edges of runways, minuteman launch crews were ordered to be launch-ready, and the National Emergency Airborne Command Post (NEACP) otherwise known as the 'doomsday plane' was launched.

A somewhat similar incident involved the mistaken insertion of a 'practice tape' for 'doomsday' (one has to rehearse for such things) into the main command computer at NORAD. The only reason we know it even took place was, it seems, because a congressional committee happened to be there at the time and they described what ensued as 'blind panic'.

Finally, Zbigniew Brzezinski describes how he was, sometime in 1979, awoken at 3am by his 'military assistant', a general, who said simply, 'sorry to wake you sir. We're under nuclear attack'. The computers at NORAD were indicating 200 or so Soviet missiles incoming. Brezinski was then supposed to use the next 3 minutes to 'verify' the attack and was then supposed to wake the president, who would have a further 3 minutes to decide whether or not to launch a number of thousands of warheads at the then Soviet Union. At the two minutes and fifty seconds mark a second call came to Brzezinski, saying it had been a false alarm, and 'I went back to sleep'. Asked what would have happened if the second call had been a little late, he said 'we might have had a problem'. Indeed so.

His account is as follows:
“.....
I remember being woken up one night at 3:00 a.m. to be told by my military assistant that we are under nuclear attack. It obviously didn't happen, since we're all here. (Laughter.) There would have been... 85 million Americans and Soviets dead six hours later....

"Part of my job was to coordinate the response if something like that happened, to notify the president. I had three minutes in which to notify him. During those three minutes, I had to confirm it in a variety of ways. And then he would have four minutes to decide how to respond. And then 28 minutes later, some of us would be dead and we'd be living in a different age...

I got a message from my military assistant, a general, who simply woke me up at 3:00 a.m. at night on the red phone and said, "Sorry to wake you up. We're under nuclear attack." (Scattered laughter.) That kind of wakes you up.... And he adds 30 seconds ago, 200 Soviet missiles have been fired at the United States...

But there were subsequent confirmations and clearly within – well, within actually almost two minutes prior to me calling him on the third minute, it was clear that this was a false alarm. So I did nothing. I went back to sleep. (Laughter)"

But then came the real punch line. The interviewer asked, "And if the confirmation had been a little late, could we have had a problem?" Brzezinski's answer: "We might have had." [12]

All of these incidents have been false alarms or false data that nearly ignited a massive exchange of nuclear warheads (and in none of them thus far, are we talking about a single 'rogue launch', but about the validly ordered launch of thousands of warheads). They could have done so but for various reasons that often border on the miraculous, they didn't.

There is just one more incident, a little unlike the others as it does involve the possibility of a 'rogue launch'. A minuteman launch crew were performing a practice launch countdown, when it mysteriously turned into the real thing and would not stop. In this case, the resourceful launch control officer managed to delay it until he could position heavy military vehicles right on top of silo doors, making a launch physically impossible. Again I do just wonder how to quantify what was a brilliant and world-saving initiative.[13]

And....given that this canter through would-be apocalyptic near-misses contains so many of them plus an unknown number that we are not permitted to know about, just what does that say about the continuing likelihood of an inadvertent apocalypse, and thus about the probability of human survival into an indefinite future?

An examination of these incidents in detail has indeed led some (notably General Lee Butler who for a number of years commanded US Strategic nuclear forces), to conclude that we literally shouldn't be here at all and that even our survival thus far is a result of “blind good luck and divine providence ….actually, I think almost entirely divine providence.”

Divine providence or not, what else a study of these incidents tells us is

that there are just too many of them! Allowing for the classification of them since 1985, we have almost one major incident per year, or at least every two years. While I really want to be wary of assigning precise numbers, the likelihood of an inadvertent nuclear exchange would seem to me to be considerably in excess of a near miss once every fifty years, or even one every ten years, as the frequency of a 'CMTC event' might be used to suggest. A near miss every 3-5 years is probably still an over-conservative guesstimate. We may indeed, as General Butler suggests, be improbably lucky to be here at all.

Barrett, Baum and Hostetler caveat their attempt to quantify the risk of an accidental apocalypse by saying that:
"...the overall risk model probably results in a significant under-estimation of the overall risks of inadvertent nuclear war because of the many possible failure modes that the model in this paper does not account for." [14]

Hellman too believes that the overall risk of dying as a result of nuclear war is some 200 times the risk of living near a nuclear power plant.[15]

I think the point has now been well established that:
--The risk of inadvertent nuclear war is nonzero but hard to quantify precisely as it depends on highly specific event sequences and on human judgement.
--There have already been a disturbingly large number of near misses, such that to some observers (notably a former chief of STRATCOM) our survival thus far already looks improbable.
--There are concrete measures that could be taken by the NWS, and in particular by the US and Russia that would do much to decrease those risks, (De-alerting, establishment of a joint data exchange centre), but they are not being taken and/or are being actively resisted.

In the words of the ICNND:
"The prospect that a catastrophic nuclear exchange could be triggered by a false alarm is fearful and not fanciful."[16]

Indeed so.

This then leads us to the next step as it were, in looking into the abyss:
We need to ask just what factors might:
--Lead to a large exchange of nuclear weapons
--Bring about the incineration of a very large number of cities that would in turn bring about the lofting of up to 180million tonnes of very black soot into the stratosphere (and incidentally incinerate 1-3billion people in less than 2 hours).
--As a result, drop global temperatures to levels last seen in the last

ice – age, at least for over a decade.

It might be commented that even this radical surgery to global climate, while it would wipe out many many species (especially in the tropics), and while it would certainly cause famines in which a large percentage of humans would probably die, especially but not exclusively in developing countries that might otherwise be relatively unscathed, - that it would nonetheless not lead to actual human extinction, though it would be certainly the end of what we call 'civilisation', possibly for centuries.

Professor Alan Robock, Brian Toon, Ira Helfand, and a number of others are much more expert than I on the precise climatic consequences of the burning of a large number of cities that are set alight in a roughly 40-90 minute timeframe by 50-150kiloton warheads, or in the case of the subcontinent by 15-50kiloton warheads.

However some things can be said about how it actually plays out.

Important variables will be:

--precise targeting strategies. Are cities primary targets, or are they mere collateral damage in a counterforce strike? It seems that even in a counterforce strike, the US is said to lose up to 50% of its urban areas.

--Size of warheads. Though bigger warheads obviously do more damage, it does not 'scale', and 10 X15kilotons does considerably more damage than 1X150kilotons.

--Size of the city targeted and density of population. Toon and Robock's simulations show that, when targeted by 15kiloton and by 100kiloton warheads, Chinese cities produce both the largest casualty numbers and the largest quantities of soot, followed by Indian, Pakistani, and Egyptian cities and then by Moscow, Tokyo, and New York. What seems to matter most is the cities density of population, which seems to correlate strongly with fuel load. [17]

Again, paradoxically, many somewhat smaller warheads are better at producing massive amounts of soot than fewer larger warheads.[18] [19]

Clearly there are enough variables that the outcome of any particular nuclear exchange, accidental or deliberate, is highly unpredictable. However we know enough to say with reasonable confidence that:

--An India–Pakistan nuclear exchange involving between 100 and 200

warheads between 5 and 50kilotons,(Robock et al model 50 x 15Kt warheads each but India and Pakistan have expanded their arsenals to at least double that -) with the larger ones primarily targeted at major cities (Delhi, Mumbai, Islamabad, Karachi), and the smaller ones primarily used against tank formations, would, apart from vaporising many of my large number of Indian friends and colleagues, produce a prompt body-count of between 50 million and 150million. It would inject between 5 and 10 million tonnes of black soot into the stratosphere, over the ensuing days as the cities burned.

This would produce global climatic effects somewhat like the 'year without a summer' (1815), caused by the eruption of Mt Tambora in Indonesia, which caused frosts and snow in summer in NE United States and Western Europe, inspiring Mary Shelley to write 'Frankenstein'. At current levels of food production and demand, this could in turn according to projections by Ira Helfand of PSR, [20] give rise to up to a billion further deaths worldwide from famine. Ozdogan Et Al show major impacts of a Pakistan-India nuclear winter in midwest USA, on maize, soy, and other crops with major shortening in growing season and drought. [21]

A major US-Russia nuclear exchange involving 'operational' arsenals of 2-3000 x 100-300kiloton weapons, (with perhaps 40-50 x 5megaton Chinese warheads) targeting mostly US, Russian, European, Japanese, and Chinese cities, would produce prompt casualties anywhere between a few hundred million and billions depending on precise targeting. It would loft up to 180 million tonnes of black soot into the stratosphere, and would depress global temperatures to levels not seen since the last ice – age. Minimum daily temperatures in North America and Eurasia would fall below freezing for one to three years, and growing seasons would be eliminated for a decade or longer, meaning that food production would cease. Most humans would perish from famine. Toon and Robock note that:
“...we estimate that the direct effects of using the 2012 arsenals would lead to hundreds of millions of fatalities. The indirect effects would likely eliminate the majority of the human population.”[22]

Even a 'successful' nuclear strike would STILL be suicidal for the attacking nation,(and everyone else) because of the climatic consequences. Toon and Robock note that:
“Nuclear winter theory tells us that it would be suicidal for country A to launch a full-scale nuclear attack on country B regardless of whether country B responds in kind. The resulting climate changes, triggered by smoke, would be so damaging to food and water supplies that infrastructure break- down would assure starvation in the attacking country as well as the rest of the world. Call it self-assured

destruction, or SAD."[23]

This makes nonsense of claims by some (especially Lieber and Press) in the nuclear strategy community that it might be in the interest of the US to conduct a first strike against Russia. Lieber and Press argue that:
"….technological innovation has dramatically improved the ability of states to launch "counterforce" attacks— that is, military strikes aimed at disarming an adversary by destroying its nuclear weapons...."
"...for nuclear analysts weaned on two seeming truths of the cold – war era – that nuclear arsenals reliably deter attacks via the threat of retaliation and that nuclear weapons use is tantamount to mass slaughter – the implications of the counterforce revolution should be jarring."[24]

It is notable that, at least in the article in which this statement appears, no evidence whatsoever is advanced that might actually make anyone think it might be true. Just where is this 'counterforce revolution and what is it? And indeed, the evidence is that the dead opposite is in fact true. The analyses performed recently by Kristensen and McKinzie in the UNIDIR paper just released, and in 2010 by Yarynich, Blair, and others (100 nuclear Wars') shows decisively that the 'seeming truths of the cold war' about the likelihood of retaliation remain unambiguously the case. Unacceptable levels of retaliation (meaning the loss of most of the attacking country's population), and therefore 'mass slaughter' remain the outcome of any nuclear attack, and any attempt to attain 'nuclear primacy' a la Lieber and Press, remains what it has always been namely lunacy. However, what Robock et al argue in their most recent BAS contribution, is that even in the complete absence of any retaliation whatsoever, the (global) effects of even a counterforce strike – precisely the kind if strike that Lieber and Press argue that the putative 'counterforce revolution' makes it possible to do consequence – free – will cripple the attacking country.

Again, the simulation work done by Colonel Yarynich, Blair and others on de-alerted nuclear weapons not only shows that deterrence is maintained because there is always a capability to inflict unacceptable damage amounting to tens to hundreds of millions of casualties on an attacker even after a 'splendid first strike', but that for the very same reason, a 'counterforce' first strike can never be assurred of success and the likelihood of a retaliation that will cause the attacking country the loss of most of its population is in all cases unacceptably high. [25]

Lieber and Press in their most recent article do not reference or otherwise

acknowledge either the work of Col.Yarynich, Blair, Mc Kinzie, Kristensen et al, nor the work of Robock et al, both of which make nonsense of their case.

This would mean that a very large proportion of all humans – certainly as already suggested, in the billion plus frame – could, after the 'ultimate bad day' at Norad, Stratcom, Serpukhov-15 or Kosvinsky Mt, be expected to perish from lack of food over the ensuing decade. It is indeed, a little hard to see how humans could survive at all if the result of a large scale nuclear exchange were a full decade in which food would not grow at all, anywhere. And even if there were isolated pockets in which food grew, the overwhelming majority of humans would, indeed, perish.

And of course, all of the infrastructure of contemporary consumerist capitalism would be entirely gone. One wonders just how the young, so incredibly net-dependent, would cope if it simply was not there at all – (indeed, not just the net, but electricity) – The disabling of all electrical and electronic infrastructure and devices is something that can be achieved without the destruction of even one city, (along with the literal disappearance of the global financial system) by the explosion of a few large weapons in space.

And note that the creation of ice-age conditions as well as the destruction of most humans can be achieved with as few as 2-3000 warheads – a fraction of cold – war arsenals.

Note also that what we are looking at – the certain destruction of contemporary consumerist, technological society and the death of most, if not all, humans – is an event that in any given year, has a non-zero probability, and has at times loomed terrifyingly close.

All that needs to take place, in order for such an inadvertent apocalypse to unfold, as Barrett, Baum and Hostetler's analysis makes clear, is, on the US side:
--The mistaking of false data concerning a launch by the other side, for a real launch at the level of missile display conference
--The promotion of the mistaken data to the level of a missile attack conference
--A request to a harassed decision-maker at 3am or in the middle of an election speech, for an order to launch, with 3 minutes to make a decision that no human should ever have to make. An equivalent event sequence would be required to unfold on the Russian side. As we have seen such event sequences have already unfolded a number of times.

It's come close, as Brezhinski admitted, in his account of his own brush

with nuclear war. It has been close on a disturbingly large number of occasions. It may be as General Lee Butler says, that we are lucky, even divinely blessed, to have come thus far.

(-And if as Butler suggests, our survival thus far is in fact miraculous, just how large is the supply of miracles? When does divine providence run dry?)

Finally, note that these considerations all assume that 1000-1500 on each side of US and Russian missiles are (as they are now) in fact 'launch-ready', poised to be launch-able in seconds, and that the compressed decision-making times all come from the building into nuclear postures and plans, of this quasi-instantaneous response capability. If that posture changes and with it the plans that call for quasi-instantaneous response, decision-makers are no longer faced with the need to take inhuman and apocalyptic decisions in ridiculously compressed timeframes. And while some (such as former ambassador Chris Ford)[26] argue that lowering alert status means there would be a 're-alerting race' during a serious crisis, there will be such a race anyway,[27] and the rigorous modelling work done by Yarynich, Mc Kinzie and others shows quite clearly that we are orders of magnitude safer and better off with nuclear weapons removed from high alert status.

In this context, it is good to note Hans Kristensen's excellent paper released on 23rd on de-alerting, which refutes the arguments of Ford and others on 're-alerting races' decisively, showing it to be a 'straw man'. That the world is orders of magnitude safer with nuclear weapons not on high alert is simply irrefutable.[28] [29]

The recent report by Nunn, Ivanov, Brown, and others gives considerable attention to the question of 'prompt launch status' which it regards as a 'piece of cold-war autopilot'. The report states that:
“If the United States and Russia gradually remove nuclear weapons from Prompt Launch status...the threat of rapid mutual assured destruction as well as the chance of accidental, mistaken, or unauthorised launch can be sharply reduced.”[30]

Removal of strategic weapons systems from high alert status is arguably the single short-term action that would do most to improve the chances for humans to avoid extinction, as the 2008 BAS article on avoiding human extinction suggests.

Taking nuclear weapons off alert and their abolition would therefore be, to steal a phrase, not so much 'making history' as 'making history possible'. Like abolition it is a human survival imperative, or at

least an action that makes our chances very significantly better. Without it we are left, essentially, in continued dependence on 'divine providence'.

And the abolition of nuclear weapons is, as ritualistic statement after statement has intimated so truly, a human survival priority.

As every apocalypse movie – maker will know, without at least one or two dishevelled humans moving through the burned out ruins of civilisation, there is no movie, only cold and darkness.

But as Schell points out so eloquently, there is a difference in kind, between even the death of MOST humans, and the termination of humans as an entire species:
“Up to now, every risk has been contained within the frame of life: Extinction would shatter the frame. It represents not the defeat of some (particular) purpose, but an abyss in which all human purposes would be drowned for all time” [31]

Endnotes:

[1] ICNND,p3

[2]Jonathan Schell, Fate of the Earth, Picador, 1982, p6

[3] Swiss statement to 2012 NPT Prepcom, Pers. Comm. - Available on Reaching Critical Will website

[4] John Hallam and Colonel Valery Yarynich(deceased) – Memory of conversation in a bar at Praterstern Rlwy Station Vienna, May 2012

[5] Schell, Fate of the Earth, p6

[6] Anders Sandberg, Jason G. Matheny, and Milan M. Circovic, Bulletin of the Atomic Scientists, 9 Sept 2008,

[7] Letter by NGOs to Strategic Forces Subcommittees of US Congress and Russian Duma, January 2013, John Hallam, Prof. Peter King, Alyn Ware

[8] Anthony M. Barrett, Seth. D. Baum, and Kelly R. Hostedler, 'Analysing and Reducing the Risks of Inadvertent Nuclear War between the United States and Russia', Science and Global Security(forthcoming), 6 January 2013

[9] ibid

[10]ibid, Figures 2 and 3

[11]There is a film about Colonel Stanislav Petrov, readily available on the web, (producer Mark Romeo) entitled ' The Man who Saved the World'

[12]Zbigniew Brzezinski at the Council of Foreign Relations April 2012(transcript)

[13]I learned of this incident from a number of sources,(including Forden), but including, astonishingly, from the Buddhist meditation teacher of the launch control officer concerned, who resigned from the US military after the incident. I was on a bus trip to Canberra, and sat next to the meditation teacher, who said '...have I got a story for you! I had this big muscular obviously US military guy in my vipassana class and asked him his story...'!

[14]Barrett, Baum and Hostetler Op Cit, p9

[15] Martin Hellman Risk Analysis of Nuclear DeterrenceThe Bent of Tau Beta Pi Spring2008

[16] ICNND2.39

[17]Toon Op CitFig1

[18]OB Toon, RP Turco, A. Robock, C. Bardeen, L. Oman, and GL Stenchikov, Atmospheric Effects and Societal Consequences of Regional Scale Nuclear Conflicts and acts of Individual Nuclear Terrorism',Atmos. Chem Phys, 19April2007

[19]Owen B. Toon, Alan Robock, Richard P. Turco, 'Environmental Consequences of Nuclear War,Physics Today Dec2008 Fig.1 Casualties and Soot

[20]Nuclear Famine – Global Consequences of Limited Nuclear War, PSR 2012

[21]Mutlu Ozdogan, Alan Robock, Christopher J. Kucharik, Univ. Wisconsin/Rutgers, 'Impacts of a Nuclear War in South Asia on Soybean and Maize Production In the Midwest United States'

[22]Physics Today Dec 2008p37

[23]Bulletin of the Atomic Scientists, 68(5), Self Assured Destruction – the Climate Impacts of Nuclear War

[24]Kier A. Lieber and Daryl G. Press, Strategic Studies Quarterly, Spring 2013, p3-14

[25]One Hundred Nuclear Wars – Stable Deterrence between the United States and Russia at Reduced Nuclear Force Levels off AlertTechnical Appendix to Smaller and Safer – A New Plan for Nuclear Postures in Foreign Affairs, Vol89No5

[26]Chris Ford, 'Playing for Time at the Edge of the Apocalypse' Hudson Institute Briefing Paper Nov2010

[27]Hans Kristensen Paper on De-Alerting for UNIDIR 2013

[28] Hans M. Kristensen, and Matthew Mc Kinzie, Reducing Alert Rates of Nuclear Weapons, UNIDIR, May2013

[29](This author also spent much time and attention refuting Ford – see my last years Vienna prepcom presentation '...From the Planning Department of Hell')(available on PND website). Kristensen (Op Cit), also is a highly effective refutation of Ford and others who argue similarly.

[30] Browne, Ischinger, Ivanov, Nunn, Building Mutual Security2013, p10

[31]Schell, Op Cit,