

NUCLEAR PROLIFERATION - LOOKING BACK, THINKING AHEAD:
HOW BAD WOULD THE FURTHER SPREAD OF NUCLEAR WEAPONS BE?

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SUMMARY: a re-visit of past proliferation helps understand the dangers of the further spread of nuclear weapons.

Notwithstanding the establishment of an international non-proliferation regime and occasional, selective, and sometimes vigorous, country-specific non-proliferation policies, the fight against the spread of nuclear weapons has not been recognized in the past as an overriding policy objective by the international community jointly or severally (introduction). It will be argued that is largely due an overly sanguine assessment of the consequences of past proliferation, which has been less benign than is suggested by the reassuring persistence of the taboo on the use of nuclear weapons (part 1). Future proliferation's consequences appear all the more dire as a consequence of a misunderstanding of the past, which meshes in with new and worrying technical, operational and strategic developments (part 2).

'Proliferation futures' will be examined in this combined light of a flawed narrative and new developments, which may lead eventually to the deliberate or inadvertent use of nuclear weapons (part 3). In order to avoid such an outcome,

policy recommendations will be flagged (conclusion).

A LESS THAN OVERRIDING OBJECTIVE

At first blush, the prevention of the spread of nuclear weapons appears as a rare and important feature of global consensus spanning close to half a century. This is clearly the case not only in multilateral declaratory undertakings such as the 1978 Final Document of the UN Special Session on Disarmament (1), notable for its universal nature committing all member states of the United Nations at the time, which states *inter alia* that "Non proliferation of nuclear weapons is a matter of universal concern" (§36)... "It is imperative... to prevent the proliferation of nuclear weapons" (§65).

Previously, and more operationally, the Nuclear Non-Proliferation Treaty, opened to signature on 1 May 1968, laid out the elements of an international regime which has over the years acquired quasi-universal status, with only India, Israel and Pakistan holding out, while only one state (North Korea) has opted out. The NPT in turn built open an initially modest set of safeguards established by the International Atomic Energy Agency after its creation in 1957 and which have developed extensively into an ever-more intrusive system of inspections materialized in particular by the so-called Additional Protocols formalized in 1997 which have been acceded to by 115 states and which another 25 have signed (2).

Out of the 44 countries(3) possessing at least one operational nuclear reactor, 35 have ratified the Protocols and three others (India, Iran, and Israel) have signed them . Even the three countries which never joined the NPT have not signaled their intent to act against the non-proliferation aims of the NPT. Only North Korea breaks what is in effect a universal declaratory pattern to which countries pay collective and individual obeisance in words, if not always in deeds.

However, this does by no means amount to an over-riding policy imperative, at either the multilateral or national levels. On occasion, the UN as a whole has given an overriding importance to non-proliferation as opposed to other aspects of international relations but on a highly selective basis: such was the case of the imposition of mandatory UN Security Council sanctions against South Africa, when that country's work on a nuclear test site was uncovered in 1977 (4); and again in the wake of the Gulf War of 1991, when the Security Council mandated the nuclear, biological and chemical disarmament of Iraq(5). But these policies were country-specific, not general in nature. Similarly, non-proliferation only rarely and usually selectively, takes precedence over other elements of bilateral relations between given states. Israel takes firm exception to nuclear wannabees insofar that they deny its right to existence, but is little interested beyond. American militancy against Pakistan's nuclear

ambitions withered when Islamabad's help was required after the Soviet invasion of Afghanistan; in 2005, Washington spectacularly conceded to India privileges which are normally reserved to bona fide NPT signatories when it signed its bilateral nuclear agreement with that country, a precedent which China is now tempted to grant Pakistan... Russia, France, Britain or other industrialized states take a no less 'pick and choose' approach. Despite the misgivings and reservations of some, the 45 member states of the Nuclear Suppliers Group did not prevent the lifting of restrictions vis à vis India flowing from the US-India nuclear agreement (6). The weakening of the NPT entailed by that agreement took second-place to other considerations, such as India's economic or strategic importance.

There is thus a substantial contrast between non-proliferation as an objective and its actual level of priority. In itself, this is neither unusual in international relations (how many other lofty goals are simultaneously proclaimed and neglected?) nor readily avoidable, as the examples cited above demonstrate. However, nuclear weapons have by general acknowledgement (which rests on an all-too reliable set of unimpeachable physics and an even less debatable set of practical data from nuclear use and testing) a unique ability to instantaneously destroy entire populations. That consideration would normally have given non-proliferation a

higher rank and a broader remit in the order of international priorities, even if one takes fully into account the Realpolitik requirements of the Cold- and post-Cold-War eras.

There are strong and mutually reinforcing empirical and logical reasons which explain this disconnect in the past and which continue to inform the manner in which prospective further proliferation is being approached.

In empirical terms, two facts stand out: runaway nuclear proliferation has not occurred and nuclear weapons have not been used, in anger or by accident, since the bombing of Hiroshima and Nagasaki. As long as proliferation had remained confined to countries which were in alliance with the United States, such as the United Kingdom and France (which tested their first devices in 1952 and 1960 respectively), there was little additional fear of a breaking of the taboo on nuclear use in either Washington or Moscow -although the US was even less happy than the USSR at French nuclear ambitions. However, a go-it alone nuclear Red China rang loud alarm bells when it was set to test in 1964, leading both to rumblings about a decapitating Soviet or Soviet-American strike (7)and, more practically, to the drafting of the NPT which sought to limit the nuclear club to those countries having tested before January 1, 1967. This was an era in which runaway proliferation had been hitherto considered as a mainstream scenario(8): in a world with nuclear free agents (the

expression 'rogue state' had not yet been coined) such as unpredictable Red China, nuclear use would occur. Neither development has happened. Proliferation has remained limited to a limited set of countries (the five 'official', the three 'de facto', the North Korean 'sort-of', the Iranian putative, nuclear powers), and roll-back has occurred willy-nilly: nuclear South Africa disarmed; quasi-nuclear Sweden, once-aspiring or potential Argentina, Brazil, Canada, Germany, Iraq, Italy, Libya, South Korea, Switzerland, Syria, Taiwan eventually renounced the nuclear road; along with the liquidation of the nuclear legacies in Belarus, Kazakhstan and Ukraine. The "system", however defined (from the role of the NPT to preemptive military strikes against Iraq and Syria by way of defense guarantees within NATO or to Sweden and Ukraine) has more or less worked during the last decades of the XXth century. Nor has the formal advent to nuclear military status, of India and Pakistan in 1998 led to use, while the prospect of Mao's China running amok have been superseded by a quiescent nuclear doctrine in the Middle Kingdom.

The power of this empirical evidence appears in the choice of our leaders' words. Dire forecasts, and corresponding practical calls for concrete action, are made (rightly) by (mostly Western leaders) about the possible consequences of Iran going nuclear; pie-in-the-sky speeches are made about the

need to eliminate all nuclear weapons: but what is largely missing is the bridging language between these two levels of concern of the sort Kennedy used to address the perceived challenge of short-term run-away nuclear proliferation and its implied consequences: in his March 1963 press conference (see endnote 8) he was linking non-proliferation to the prospective test ban treaty (9).

Largely missing but not entirely so, as non-state proliferation resulting in nuclear terrorism has been (correctly) seized upon after 9/11 by Presidents Bush jr. and Obama, leading to the first global Nuclear security Summit in Washington DC in April 2010. But however necessary it may be address that fear, which had been identified earlier by able novelists (10), it has not (mercifully) yet materialized in empirical terms either .

The empirical evidence which informs non-proliferation's policy status sustains, and is sustained in turn by, reasoning on the supposed inherent stability of deterrence, in all of its declensions: unilateral, bilateral or even multilateral.

Given their disproportionate power, nuclear weapons cannot serve to achieve limited policy goals, thus excluding their use as Clausewitzian weapons; further, the possession of nuclear weapons may even inhibit actions which an aggressive non-nuclear power would otherwise contemplate versus a nuclear power. Stalin at the head of a still clearly non-nuclear USSR

blockaded Berlin, an action which none of his nuclear armed successors sought to emulate. As a non-nuclear power, Red China bombed Taiwan repeatedly. The worst of it ceased after Beijing acquired nuclear weapons. Possession of nuclear weapons, possibly after a learning curve, appears to self-deter escalatory aggressive behavior.

Bilateral deterrence between two nuclear powers has long been deemed to moderate direct confrontation and to deflect aggressive behavior towards proxies (11). Although no such theoretical consensus exists vis à vis the possible stability of multi-cornered possession of nuclear weapons, the case has been made by powerful authors such as Ken Waltz or Pierre Gallois (12). In practice, a global multipolar nuclear order was established to some extent since the 1960s, with the USSR, the US and China forming a strategic triangle which was perceived as such by the authors of the Nixon-to-Beijing visit. A regional multipolar dispensation arguably also exists between China, India and Pakistan. These relationships have apparently not led to instabilities greater than (or even as great as) those which have characterized the US-Soviet nuclear standoff.

In short, proliferation has been a manageable, slow-motion process, nuclear weapons have not been used nor has the probability of their use appear to have increased (rather the opposite). Its overall status is satisfactory, provided some

adjustments are made in terms of securing material from non-state actors, even if the policy mix sustaining it is messy and occasionally fraught -as so many things are in international life. Difficult case-specific situations such as Iran today will continued to be handled as such, as Iraq was yesterday.

THE PAST IS NOT WHAT IT USED TO BE

The problem with this reassuring reading of the past is that it is not entirely true. Yes, the NPT had a major material effect by gradually making non nuclear the new normal. Yes again, defense guarantees by the US weaned Germany, Italy (13), South Korea, Taiwan and even neutral Sweden away from the nuclear road, followed by the US-French-British assurances to post-Soviet Ukraine. Yes too, various levels of coercion worked in Iraq, Libya and Syria. But no, the practice of even the most 'classical' bilateral deterrence was not nearly as reassuring as the mainstream narrative inherited from the Cold War would have it. Nor can we consider that our elements for empirical judgment as methodologically satisfactory in terms of their breadth and depth. These two negatives will be examined in turn.

Nuclear archives, as other sensitive governmental archives, open up usually after an interval of decades and even then with varying levels of culling and redaction. Even oral histories tend to follow this pattern, as ageing witnesses

feel freer to speak up. Hence a paradox: when the Soviet-American nuclear confrontation was central to our lives and policies during the Cold War, we didn't know how bad things really were; now that we are beginning to know, there is little public interest given the disappearance of the East-West contest. Yet there are lessons of general interest which can be summarized as follows: 1) the Cuban missile crisis brought us much closer to the brink than the acute sense of danger which prevailed at the time, for reasons which are germane to the current situation: massive failures of intelligence on Soviet nuclear preparations and dispositions in Cuba, notably on tactical nukes and on the operational readiness of a number of IRBMs and their warheads; dysfunctional or imperfect command and control arrangements (notably vis à vis Soviet submarines), unintentionally mixed signals on each antagonist's actions). These are effectively laid out in Michael Dobb's book, "One Minute to Midnight"(14). 2) the safety and security of nuclear forces are subject to potentially calamitous procedural, technical or operational mishaps and miscalculations, somewhat along the lines of what applies to related endeavors (nuclear power and aerospace). Scott Sagan in his "Limits of Safety"(15) provides compelling research on the American Cold War experience. It would be interesting to have a similar treatment on the Soviet experience...Although it can be argued that today's nuclear arsenals are much smaller and easier to manage reliably, and

that the technology for their control has been vastly improved, several facts remain:

the US has continued to witness serious procedural lapses in the military nuclear arena (16); the de-emphasis of the importance of nuclear weapons in the US force structure is not conducive to treating them with the respect which is due to their destructive power; other nuclear powers do not necessarily benefit from the same technology and learning curves as the older nuclear states, and notably the US; cheek-to-jowl nuclear postures, which prevailed in the Cuban missile crisis and which help explain why World War III nearly occurred, and which characterize India and Pakistan today.

Despite the dearth of detail on Indian and Pakistani nuclear crisis management, we know that the stability of nuclear deterrence between India and Pakistan is by no means a given, with serious risks occurring on several occasions since the mid-1980s(17).

At another level of analysis, we have to recognize the limits of the database on which we ground our policies on non-proliferation. The nuclear age, in terms of operationally usable devices, began in 1945, less than seventy years, less than the age of an old man. The fact that there has been no accidental or deliberate nuclear use during that length of time is nearly twice as reassuring as the fact that it took more than thirty years (18) for a nuclear electricity

generating plant to blow up, in the form of the Chernobyl disaster of 1986. But given the destructive potential of nuclear weapons, twice as much reassurance (in the form of no use of nuclear weapons for close to seventy years) is probably not good enough. Furthermore, the Chernobyl disaster involved the same sort of errors of judgment, procedural insufficiencies and crisis-mismanagement visible in Scott Sagan's book, not only or even mainly, flawed design choices: inadvertence at work, in other words of the sort which could prevail in a time-sensitive, geographically constrained Indo-Pakistani or Middle Eastern conflict. Give it another seventy years to pass judgment?

The same empirical limits apply to the number of actors at play: we have simple bipolar (US-USSR/Russia or India/Pakistan) and complex bipolar (US/France/UK/NATO-Soviet Union/Russia) experience; we've had US-Soviet-Chinese or Sino-Indian-Pakistani tripolarity; and we've had a number of unipolar moments (one nuclear state vis à vis non-nuclear antagonists). But we mercifully have not had to deal with more complex strategic geometries -yet- in the Middle East or East Asia. We only know what we know, we don't know what we don't know.

A historical narrative which is not reassuring and an empirical record that is less than compelling need to inform the manner in which we approach further proliferation.

PROLIFERATION PUSH AND PULL

Ongoing proliferation differs from that of the first half-century of the nuclear era in three essential ways: on the demand side, the set of putative nuclear actors is largely focused in the most strategically stressed regions of the world; on the supply side, the actual or potential purveyors of proliferation are no longer principally the first, industrialized, generation of nuclear powers; the technology involved in proliferation is somewhat less demanding than it was during the first nuclear age. Taken together, these changes entail growing risks of nuclear use.

Demand is currently focusing on two regions, the Middle East and East Asia (broadly defined) and involves states and, potentially, non-state actors. In the Middle East, Iran's nuclear program is the focus of the most intense concerns. A potential consequence in proliferation terms would be to lead regional rivals of Iran to acquire nuclear weapons in term: this concern was vividly in 2007 by the then President of France, Jacques Chirac (19) who specifically mentioned Egypt and Saudi Arabia. The likelihood of such a "proliferation chain-reaction" may have been increased by President Obama's recent repudiation of containment as an option (20): short of Iran being persuaded or forced to abandon its nuclear ambitions, the neighboring states would presumably have to contemplate security options other than a Cold War style US

defense guarantee. Given prior attempts by Iraq, Syria and Libya to become nuclear powers, the probability of a multipolar nuclear Middle East has to be rated as high in case Iran is perceived as having acquired a military nuclear capability. Beyond the Middle East, the possibility of civil war in nuclear-armed Pakistan leading to state failure and the possibility of nukes falling out of the hands of an effective central government. There are historical precedents for such a risk, most notably, but not only(21)in the wake of the collapse of the Soviet Union: timely and lasting action by outside powers, such as the US with the Nunn-Lugar initiative, and the successor states themselves has prevented fissile material from falling into unauthorized hands in significant quantities. Pakistan could pose similar problems in a singularly more hostile domestic environment. As things stand, non-state actors, such as post-Soviet *mafiya* bosses (interested in resale potential) or Al Qaeda (22) have sought, without apparent success, to benefit from opportunities arising from nuclear disorder in the former USSR and Central Asia. Mercifully, the price Al Qaeda was ready to pay was way below the going rate (upwards of hundreds of \$million) for the sorts of services provided by the A.Q.Khan network (see below)to some of his clients

Although North Korea's nuclear ambitions appear to be both more self-centered and more containable than is the case for

Iran, the possibility of state collapse in combination with regional rivalry leave no room for complacency.

More broadly we are facing the prospect of a multipolar nuclear Middle East, linked to an uncertain nuclear Pakistan already part of a nuclear South Asia tied via China to the Korean nexus in which nuclear America and Russia also have a stake. More broadly still, such a nuclear arc-of-crisis from the Mediterranean to the Sea of Japan, would presumably imply the breakdown of the NPT regime, or at least its reversion to the sort of status it had during the Seventies, when many of its currently significant members had not yet joined (23), unloosening both the demand and supply sides of proliferation.

On the supply side, "old style" proliferation relied on official cooperation between first-generation nuclear or nuclearizing powers, of which the Manhattan project was a forerunner (with American, British and Canadian national contributions and multinational scientific teams), followed inter alia by post-1956 French-Israeli, post-1958 US-UK, pre-1958 USSR-China cooperation. If India relied heavily on the "unwitting cooperation" , notably on the part of Canada and the US involved in the Atoms for Peace CIRUS research reactor, Pakistan set up the first dedicated, broad spectrum, cross-border trading network to make up for the weakness of its limited industrial base. This import-focused organization thus went beyond traditional espionage-aided efforts (as

practiced by the USSR during and after the Manhattan project) or case-by-case purloining or diversion of useful material on the global market (as practiced by Israeli operatives). Even before the Pakistani network had fulfilled its primary task of supplying the national program, it began its transformation into an export-oriented venture.

Libya, Iran, North Korea and a fourth country which remains officially unnamed became the main outlets of what became the world's first private-sector (albeit government originated and ,presumably, supported)proliferation company which was only wound down after strong Western pressure on Pakistan after 9/11. Although the by-now richly documented A.Q.Khan network (24) appears to have ceased to function in its previous incarnation, it has powerfully demonstrated that there is an international market for proliferation which other operators can expect to exploit. Furthermore, budding, resource-weak nuclear powers have a strong incentive to cover the cost of their investment by selling or bartering their nuclear-related assets, including delivery systems. The fruits of state-to-state cooperation between Iran, North Korea and Pakistan are clearly apparent in the close-to-identical genealogy of their nuclear-capable ballistic missiles of the No-Dong/Ghauri/Shahab families displayed in military parades and test launches. Not all such cooperation consists of televised objects.

Even in the absence of game-changing breakthroughs, technical trends facilitate both demand and supply-side proliferation. For the time being, the plutonium route towards the bomb remains essentially as easy and as difficult as from the earliest years of the nuclear era. Provided a country runs a (difficult-to-hide) research or a power reactor from which low-irradiated fuel can be downloaded at will (such as CANDU-type natural uranium reactors), reprocessing is a comparatively straightforward and undemanding task. Forging and machining a multiple-isotope metal which is notorious for its numerous physical states and chemical toxicity is a substantial challenge, with the companion complications of devising a reliable implosion mechanism. Nuclear testing is highly desirable to establish confidence in the end-result. Opportunities for taking the plutonium-proliferation road may increase somewhat as new techniques (such as pyro-processing) come on stream. Developments in the enriched uranium field have been more substantial in facilitating proliferation. The development of lighter and more efficient centrifuges make it easier for a state to extract enriched uranium speedily in smaller and less visible facilities. Dealing with the resulting military-level HEU is a comparatively undemanding task. The long-heralded advent of industrially effective and reliable laser enrichment technology may eventually further increase ease of access. Downstream difficulties would still remain. Although implosion-mechanisms are not mandatory, they

are desirable in order both to reduce the critical mass of U235 for a nuclear explosion and to make for a lighter and smaller more-readily deliverable weapons package.

In sum, incremental improvements increase the risk of proliferation. However, non-state actors are not yet, and will not be on the basis of known technical trends, in a position to master the various steps of the two existing military nuclear fuel cycles, which remain the monopoly of states. Non-state actors would need the active complicity from (or from accomplices within) states, or benefit from the windfall of state collapse, to acquire a military nuclear capability. The threat of nuclear terrorism continues to be subordinated to developments involving state actors, a remark which is not meant to be reassuring since such developments (see above) are increasingly likely as proliferation spreads to new states and as state failure threatens in the 'arc of proliferation' extending from the Mediterranean to North-East Asia.

Furthermore, non-state actors can be satisfied with levels of nuclear reliability and performance which states could not accept. A difficult-to-deliver or fizzle-prone nuclear device would not provide a state with the level of deterrence needed to shield it from pre-emptive or retaliatory action, whereas a terrorist group would not be seeking such immunity. A road or ship-delivered imperfect device, which would be closer to a radiological bomb than to a fully-fledged atomic weapon would

provide its non-state owners with immense potential. The road to a non-state device does not need to be as well-paved.

NUCLEAR FUTURES

'New' lessons from a revisited past and current trends in nuclear proliferation, will tie into a number of characteristics of contemporary international relations with potentially destabilizing consequences, leading to an increasing likelihood of nuclear use. Four such characteristics will be singled out here both because of their relevance to nuclear crisis management and because of their growing role in the world system in the age of globalization:

- Strategic upsets
- Limits of imagination
- Unsustainable strains
- Radical aims

The 2008 French Defence and National Security White Paper (25) developed the concept of 'ruptures stratégiques' (strategic upsets) to describe the growing tendency of the world system to generate rapid, unexpected, morphing upsets of international security as a consequence of globalization broadly defined against the backdrop of urbanizing populations generating economic growth and environmental and resource constraints. In themselves, such upsets are not novel (see inter alia, a

pandemic such as the Black Death in 1348-49, the Great Depression not to mention World Wars or indeed the major and benign strategic upset of 1989-1991) but the very nature of globalization and the relationship between human activity and the Earth's ability to sustain them) mean more, and more frequent as well as more complex upsets. If this reading is correct -and the Great financial crisis, the Arab revolutions, the accession of China to superpower status can be mentioned as examples which followed the publication of the White paper-, then the consequences in the nuclear arena will be twofold. First, nuclear doctrines and dispositions which were conceived under a set of circumstances (such as the Cold War or the India-Pakistan balance of power) may rapidly find themselves overtaken by events. For instance it is easier to demonstrate that US and Russian nuclear forces still visibly bear the imprint of their 1950s template than it is to demonstrate their optimal adaptation to post-post-Cold War requirements. Second, more challenges to international security and of a largely unforeseeable nature mean greater strains placed on the ability of nuclear powers to manage crises against the backdrop of their possession of nuclear weapons. In many, indeed most, cases, such 'ruptures stratégiques' will no doubt be handled with nuclear weapons appearing as irrelevant: hypothetical security consequences of an epidemic (such as the interhuman transmission of the H5N1 bird flu virus) or prospective conflicts resulting from climate change do not

have *prima facie* nuclear aspects. But beyond the reminder that we don't know that as a fact, the probability is, under the 'rupture stratégique' hypothesis, that there will be more occasions for putting all crisis management, including nuclear, to the test.

Human societies tend to lack the imagination to think through, and to act upon, what have become known as 'black swan' events (26): that which has never occurred (or which has happened very rarely and in a wholly different context) is deemed not be in the field of reality, and to which must be added eventualities which are denied because their consequences are too awful to contemplate. The extremes of human misconduct (the incredulity in the face of evidence of the Holocaust, the failure to imagine 9/11) bear testimony to this hard-wired trait of our species. This would not normally warrant mention as a factor of growing salience if not for the recession into time of the original and only use of nuclear weapons in August 1945. Non-use of nuclear weapons may be taken for granted rather than being an absolute taboo. Recent writing on the reputedly limited effects of the Hiroshima and Nagasaki bombs (27) may contribute to such a trend, in the name of reducing the legitimacy of nuclear weapons. Recent (and often compelling) historical accounts of the surrender of the Japanese Empire which downplay the role of the atomic bombings in comparison to early research can produce a similar effect,

even if that may not have been the intention (28). However desirable it has been, the end of atmospheric nuclear testing (29) has removed for more than three decades the periodic reminders which such monstrous detonations made as to the uniquely destructive nature of nuclear weapons. There is a real and growing risk that we forget what was obvious to those who first described in 1941 the unique nature of yet-to-be produced nuclear weapons (30). The risk is no doubt higher in those states for which the history of World War II has little relevance and which have not had the will or the opportunity to wrestle at the time or *ex post facto* with the moral and strategic implications of the nuclear bombing of Japan in 1945.

Unsustainable strains are possibly the single most compelling feature of contemporary proliferation. Tight geographical constraints -with, for instance, New Delhi and Islamabad located within 300 miles of each other-; nuclear multipolarity against the backdrop of multiple, criss-crossing, sources of tension in the Middle East (as opposed to the relative simplicity of the US-Soviet confrontation); the existence of doctrines (such as India's 'cold start') and force postures (such as Pakistan's broadening array of battlefield nukes) which rest on the expectation of early use; the role of non-state actors as aggravating or triggering factors when they are perceived as operating with the

connivance of an antagonist state (in the past, the assassination of the Austrian Archduke in Sarajevo in 1914; in the future, Hezbollah operatives launching rockets with effect against Israel or Lashkar-e-Taiba commandos doing a 'Bombay' redux in India?) : individually or in combination, these factors test crisis management capabilities more severely than anything seen during the Cold War with the partial exception of the Cuban missile crisis. Even the overabundant battlefield nuclear arsenals in Cold War Central Europe, with their iffy weapons' safety and security arrangements, were less of a challenge: the US and Soviet short-range nuclear weapons so deployed were not putting US and Soviet territory and capitals at risk.

It may be argued that these risk factors are known to potential protagonists and that they therefore will be led to avoid the sort of nuclear brinksmanship which characterized US and Soviet behavior during the Cold War in crises such as the Korean war, Berlin, Cuba or the Yom Kippur war. Unfortunately, the multiple nuclear crises between India and Pakistan demonstrate no such prudence, rather to the contrary. And were such restraint to feed into nuclear policy and crisis planning -along the lines of apparently greater US and Soviet nuclear caution from the mid-Seventies onwards-, the fact would remain that initial intent rarely resists the strains of a complex, multi-actor confrontation between inherently distrustful

antagonists. It is also worth reflecting on the fact that during the 1980s, there was real and acute fear in Soviet ruling circles that the West was preparing an out-of-the-blue nuclear strike, a fear which in turn fed into Soviet policies and dispositions (31).

The Cold War was a set of crises and misunderstandings which came within a whisker of a nuclear holocaust; India and Pakistan's nuclear standoff is deeply unstable not least as a result of the interaction with non-state actors; a multipolar nuclear Middle East would make the Cuban missile crisis look easy in comparison.

Great conflicts tend to occur when one or several of the antagonists views the status quo as sufficiently undesirable and/or unsustainable to prompt forceful pro-action.

Notwithstanding widespread perceptions to the contrary, this was not the case of the USSR and the United States during the Cold War. The US had chosen a policy of containment, as opposed to roll-back, of the Soviet Empire within its limits established as a result of World War II. The Soviet Union seized targets of opportunity outside of its 1945 area of control but avoided direct confrontation with US forces.

Messianic language from the USSR on the global victory of communism or from the US about the end of the Evil Empire did not take precedence over the prime Soviet concern of preserving the Warsaw Pact and the US pursuit of containment -

and, no less crucially, their mutual confidence that they could achieve these aims without going to war one with the other.

No such generalization can be made about the Middle East, a region in which the very existence of a key state (Israel) is challenged while others have gone to war with each other (e.g. Iran-Iraq war, the Gulf War of 1990-1991), or are riven by deep internal conflicts. Actors such as Hezbollah, with its organic and functional links with Islamic Iran and Alawite Syria add to the complexities and dangers. Extreme views and actions vis à vis the strategic status quo are widely prevalent. Although the India-Pakistan relationship corresponds to something akin to the US-Soviet 'adversarial partnership', that does not apply to radical non-state actors prevalent in Pakistan with more or less tight links to that country's military intelligence services (ISI, Inter-Services Intelligence). The potential for danger is compounded by the variety of such groups: the Pashtu-related Pakistani Taliban (TTP), Kashmiri-related groups, Jihadi militants from the core provinces of Punjab and Sind... Their common characteristics are extreme radicalism, high levels of operational proficiency, and shared enmity of India. Their potential for triggering a conflict between the two countries is substantial, above and beyond the intentions of government officials.

In sum, some seventy years after the launch of the Manhattan project, there is every reason to upgrade and reinforce non-proliferation policies, if nuclear use is to be avoided during the coming decades. Some markers to that end will be laid in our concluding section.

WHAT IS TO BE DONE?

In the light of the preceding analysis, the most obvious short run implication is the absolute need to secure a satisfactory conclusion of the Iranian file. Anything which would feed the perception of less than full compliance of Iran with the strictest international safeguards or, worse, would create the impression that recessed deterrence is in place, would lead to further proliferation in the Middle East and beyond. What happens to the Iranian nuclear program will be essential to the future of proliferation and non-proliferation prospects.

In the medium term, those states which share the view that current proliferation trends would have catastrophic outcomes must display greater readiness to make those concessions which could reinforce the non-proliferation regime. Since the vast majority of countries subscribe to the proposition that reinforced non-proliferation norms imply determined moves towards nuclear disarmament by nuclear weapons states, a serious attempt has to be made to test that linkage. In practice, this means the polar opposite of the sort of linkage which led to a vacuous consensus at the 2010 NPT review

conference. On that occasion, we had a link between the industrialized states (including the western nuclear weapons states) suspending their pursuit of the universalization of the IAEA Additional Protocols in exchange of the non-aligned states' dropping their insistence on a calendar for nuclear disarmament. No non proliferation in exchange for no nuclear disarmament. At the 2015 Rev.con, the opportunity will exist to turn that sort of linkage inside out. The recommendations of the International Commission on Nuclear Non-proliferation and Disarmament (ICNND) in 2009 (32) offer practical goals in terms of nuclear disarmament of the sort which could be implemented in synergy with a reinforced non-proliferation regime. In particular, the ICNND's report suggests a so-called vantage point of nuclear disarmament compatible with prevailing strategic circumstances but leading in a fifteen year timeframe to a reduction of some 90% of the world's nuclear weapons and the capping of the arsenals of the smaller nuclear powers. Such progress, however desirable, cannot be achieved without strong political will -which is unlikely to be on call in the absence of either a successful resolution of the Iran file or an unexpected proliferation wake-up call.

In parallel, multilateral and unilateral policies limiting the spread of reprocessing and enrichment facilities should be pursued, a task which overcapacity in the global market readily justifies in economic terms. Similarly, the entry into

industrial service of new technologies which could facilitate proliferation needs to be discouraged (here again, market forces provide some leverage). A strengthening of the control on, and the recycling of, weapons grade fissile material, along the lines of what has been successfully done during the last two decades in the former Soviet Union; the tracking and securing of radioactive sources as promoted by the Nuclear Security Summits; the reinforcement of the Proliferation Security Initiative's work, notably on the trafficking of proliferation-relevant material and knowledge are all necessary, not least in reducing the risk of non-state access to something approaching a nuclear capability. However, such necessary technical measures will only serve their purpose if the political causes of proliferation are also addressed: at heart the decision to proliferate political and strategic in nature, and non-proliferation policy needs to provide a broader response than a narrowly technical one. This was the particular genius of the NPT and its ability to generate a bandwagon effect over time; this explains the effectiveness of defense guarantees and related blandishments as non-proliferation tools, and this also means that in certain circumstances broad-spectrum coercion, sometimes including the use of military force, may be required. This policy mix remains entirely relevant. It is the associated doses which need to be reconsidered: tougher non-proliferation norms, a greater readiness to reward the virtuous, and act against the

wayward -and the acceptance by the nuclear powers and their allies that it is in their interest to accept the trade-offs which may be required for such an outcome to be achieved. The Western powers may and should lead by example here, as they have been trying to do in their handling of the Iran dossier./.

END-NOTES.

(1) See:

[www.un.org/disarmament/HomePage/SSOD/GA10thSpSes1rstSpe
son%20Disarmament.pdf](http://www.un.org/disarmament/HomePage/SSOD/GA10thSpSes1rstSpe
son%20Disarmament.pdf)

(2) Figures derived from:

[www.iaiea.org/Ourwork/SV/Safeguards<:documents/sir_tabl
e.pdf](http://www.iaiea.org/Ourwork/SV/Safeguards<:documents/sir_tabl
e.pdf)

(3) The so-called 'Annex 2' countries singled out in
Comprehensive nuclear Test Ban Treaty

(4) Notably UN Security Council Resolution 418, November 4,
1977

(5) Notably UN Security Council Resolution 707, September
19, 1991

(6) The so-called '123 agreement' between India and the US
became effective on December 10, 2008, after the NSG
granted its waiver

(7) Thomas C.Reed and Danny Stillman, "The Nuclear Express
- a Political History of the Bomb and its
Proliferation", Zenith, 2009, page 104

(8) President Kennedy's press conference of March 21, 1963,
on "a world in which fifteen or twenty or twenty-five
nations may have these weapons (in the 1970s)". From:
[www.jfklibrary.org/Research/Ready-Reference/JFK-
Quotations.aspx](http://www.jfklibrary.org/Research/Ready-Reference/JFK-
Quotations.aspx)

- (9) The Partial Test Ban Treaty was signed on October 7, 1963
- (10) Such as: Larry Collins and Dominique Lapierre, "The Fifth Horseman", Simon & Schuster, 1980
- (11) For instance in Thomas Schelling's work on the strategy of conflict
- (12) See: Ken Waltz, "The Spread of Nuclear Weapons: More may be Better", Adelphi Paper n°171, IISS, 1981; Pierre Gallois, "Stratégie de l'âge nucléaire", Calman-Lévy, 1960
- (13) In the framework of the secret French-German-Italian agreement of November 1957 (revealed and declassified after the Cold War). See: Georges-Henri Soutou, "L'Alliance incertaine: les rapports politico-stratégiques franco-allemands 1954-1996", Fayard, 1966
- (14) Michael Dobbs, "One Minute to Midnight :Kennedy, Khrushchev and Castro on the Brink of Nuclear War", Knopf, 2008
- (15) Scott Sagan, "The Limits of Safety: Organizations, Accidents, and Nuclear Weapons", Princeton University Press, 1995
- (16) Such as the unauthorized flight of a B-52H bomber loaded with six nuclear-tipped AGM-129 ACM cruise missiles in August 2009 (leading to the resignation of the Secretary of the Air Force and of the Chief of Staff of the Air Force); or the mistaken shipment to

Taiwan of fuses for the nuclear payload of Minuteman ICBMs in 2006 (leading to the disciplining of seventeen senior officers). On these incidents see *inter alia*: Lolita Baldur (Associated Press), "Report slams Pentagon nuke oversight", Washington Post, January 7, 2009; Associated Press report on

www.msnbc.msn.com/id126892774/#.T3GxYWErH7g

- (17) Beginning with the "Operation Brass Tacks" Indian military exercises in 1986-87; the Kargil conflict in Kashmir in 1999; the very tense standoff which followed for close to half a year the terrorist attack against the Indian Parliament in December 2001
- (18) The Soviet reactor at Obninsk was the first to feed power into the electricity grid in 1954; the Chernobyl nuclear accident occurred thirty-two years later
- (19) Elaine Sciolino and Katrin Bennhold "Chirac Strays from Assailing a Nuclear Iran", The New York Times, February 1, 2007 (quote: 'Why wouldn't Saudi Arabia do it? Why won't it help Egypt to do it as well?')
- (20) 'I do not have a policy of containment; I have a policy of preventing Iran from obtaining nuclear weapons', President Obama's speech at AIPAC, March 4, 2012; available at: www.whitehouse.gov/the-press-office/2012/03/04/remarks-president-aipac-policy-conference-0

- (21) During the attempted military coup by French generals in Algeria in April 1961, there was a question about the exercise of control on the French nuclear test site in the Sahara and of a nuclear device which was being prepared for testing there. See the work-in-progress on this episode by Bruno Tertrais at www.npolicy.org/article_file/A_Nuclear_Coup_France_the_Algerian_War_and_the_April_1961_Nuclear_Test.pdf or via www.armscontrolwonk.com
- (22) 'Al Qaeda has tried to acquire or make nuclear weapons for at least ten years', "The 9/11 Commission Report : Final Report of the National Commission on Terrorist Attacks Upon the United States", GPO, 2004 (page 386)
- (23) China, France, Argentina, Brazil, South Africa, Algeria, among others, only acceded to the NPT after 1990
- (24) See: "Nuclear Black Markets: Pakistan, A.Q.Khan and the rise of proliferation networks. A Net Assessment", IISS, London, 2007; for a narrower, racier read: Catherine Collins and Douglas Frantz, "Fallout: the True Story of the CIA's Secret War on Nuclear Trafficking", Free Press, 2011
- (25) See, for an English-language presentation: www.archives.livreblancdefenseetsecurite.gouv.fr/IMG/pdf/white_paper_press_kit.pdf

- (26) An expression coined, in this meaning, by Nassim Taleb in his "The Black Swan: the Impact of the Highly Improbably", Random House, 2007
- (27) Ken Berry et al., "Delegitimizing Nuclear Weapons: Examining the Validity of Nuclear Deterrence", Center for Non-Proliferation Studies, Monterey, in cooperation with the Swiss Confederation, May 2010; available at: www.cns.miis.edu/opapers/pdfs/delegitimizing_nuclear_weapons_may_2010.pdf
- (28) See: Tsuyoshi Hasegawa, "Racing for the Enemy-Stalin, Truman, and the Surrender of Japan", Belknap Harvard, 2005; Richard B. Frank, "Downfall-the End of the Imperial Japanese Empire", Random House, 1999.
- (29) The last atmospheric test was conducted on October 16, 1980, by China
- (30) Frisch-Peierls Memorandum on the Properties of a Radioactive Super-bomb", March 1940; available at www.atomicarchive.com/Docs/Begin/FrischPeierls.shtml
- (31) So-called "operation RYAN" (the Russian initials for nuclear missile attack); see: Benjamin Fischer, "A Cold War Conundrum. The 1983 Cold War Scare", available at: <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/book-and-monographs/a-cold-war-conundrum/sources.htm#heading1>
- (32) "Eliminating the Nuclear Threat: A Practical Agenda", 2009, International Commission on Nuclear Non-

Proliferation and Disarmament (ICNND); see:

www.icnnd.org/Pages/default.aspx

_Looking_Back_Thinking_Ahead_How_Bad_Would_the_Further_Spread_of_Nuclear_Weapons_Be.pdf, RBatra) Given their disproportionate power, nuclear weapons cannot serve to achieve limited policy goals, thus excluding their use as Clausewitzian weapons; further, the possession of nuclear weapons may even inhibit actions which an aggressive nonnuclear power would otherwise.Â Stalin at the head of a still clearly non-nuclear USSR blockaded Berlin, an action which none of his nuclear armed successors sought to emulate. As a non-nuclear power, Red China bombed Taiwan repeatedly. The worst of it ceased after Beijing acquired nuclear weapons. How do nuclear weapons create damage? blast, thermal radiation, and nuclear radiation and also an electromagnetic pulse that can disrupt electronic equipment and can also cause fires. Dirty bombs. could be used by terrorists after they steal it or purchase it on the black market. What are the types of nuclear weapon uses?Â Nuclear weapons are deployed as a possible first use against the attacked. It is the most successful type of posture to deter conflict. Why did the UN atomic energy commission fail? Disagreements between the US and USSR.Â Horizontal Proliferation : spread of nuclear weapons to new countries. Vertical Proliferation: when nuclear weapons states increase the size of their nuclear arsenals. Partial Test Ban Treaty.