

**PROJECT ON NUCLEAR ISSUES FALL CONFERENCE  
ATOMIC WEAPONS ESTABLISHMENT  
ALDERMASTON, UK  
SEPTEMBER 21-22, 2010**

**PRESENTATION ABSTRACTS**

**SESSION ONE: MEETING NONPROLIFERATION CHALLENGES**

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**Missed Opportunity: the EU's Handling of the Iranian Nuclear Crisis**

*Mr. Paul Gould, M.A. Candidate, University of Denver*

With the EU's expansion in 2004, there was much talk about how the Europeans would again become a major player in international affairs. The Iranian nuclear crisis provided the EU the perfect opportunity to showcase their newfound role. However, as we have seen in reality, the EU has only become a minor player. Even with the development of a common security strategy and a strategy against the proliferation of WMDs, the EU ultimately failed in finding a way in resolving the crisis. There are several reasons why the EU failed to successfully halt the Iranian nuclear program. First, the EU used its 'continuing dialogue' as a means to negotiate with the Iranians. By construing the talks between the EU and Iran as a 'dialogue' instead of negotiations, the Iranians were able to press their agenda without any concern of repercussion from the EU. Second, the EU's adoption of a Common Security and Foreign Policy (CSFP) and Strategy to Combat the Proliferation of WMDs without a clear ends and means allowed the EU to drift in its negotiations with Iran. Third, the EU relied too heavily on appealing to rationality, then confronting a case of nuclear proliferation. Last, the EU has spent too much time focusing on the subject of nonproliferation then dealing with the object of nonproliferation, Iran. With this in mind, I argue specific steps the EU should take as it continues to develop its nonproliferation strategy. First, the EU must define what it finds unacceptable in when it comes to proliferation or in other words, define its 'red lines.' Second, the EU must then develop the ends and means of ensuring compliance. Third, deal with the proliferators with the possible threat of force. Although force may never be used to ensure compliance, the EU must develop the will to use force. This does not mean advancing a Bush doctrine, but having the will and capacity to use limited strikes to enforce the nonproliferation regime.

**Towards a Verified Middle East Weapons of Mass Destruction Free Zone: Challenges, Opportunities, and Next Steps**

*Mr. Foy Hubert, M.A. Candidate, Monterey Institute of International Studies, Center for Nonproliferation Studies*

The Non-Proliferation Treaty (NPT) 2010 Review Conference was significant in the health of the Nuclear Non-Proliferation Treaty because states parties agreed on an action plan for the next five years. The Conference marked fifteen years since the 1995 decision to extend the NPT indefinitely. As part of that indefinite extension decision, states parties adopted a resolution on a

WMD free zone in the Middle East (the 1995 Middle East Resolution). Since 1995 however, there has been no forward-looking and realistic program of action to promote the goals of the 1995 Middle East Resolution. The issue of WMD capabilities, particularly the nuclear option, and their delivery systems is one of the most politically sensitive and diplomatically intractable problems in the Middle East. If lack of regional progress to cap WMD arsenals or to reverse the current arming trajectory exacerbates against escalating conflicts, more states could acquire unconventional weapons and this could result in a WMD breakout. The 2010 NPT Review Conference action plan, adopted by consensus, addressed nuclear disarmament, nonproliferation and the peaceful uses of nuclear energy. As part of the action plan, the Conference agreed to hold a conference in 2012 to discuss the Middle East weapon of mass destruction free zone. The consensus final declaration reflects the will of 189 Parties to the near universal Treaty. Indeed, the Middle East States and the international community support the general concept of a WMD free zone in the Middle East – a resolution to that effect is adopted by consensus in the UN general Assembly on an annual basis. However, stakes are high for the 2012 conference due to a precarious complex security dynamic in the Middle East and daunting geopolitics that have stymied previous efforts. The Middle East is conflict-ridden and remains the most volatile and militarized region in the world. Intelligence reports estimate that Israel has produced enough material for 100 to 200 nuclear devices that could be warheads for its mobile Jericho-1 and Jericho- 2 ballistic missiles, and it is the only State in the region not party to the NPT. Iran is suspected of a clandestine nuclear weapons ambition under cover of a civil nuclear program that includes the ability to enrich nuclear fuel. Other states including Syria and Egypt are believed to have biological and chemical weapons capabilities. The differences in priorities and approaches to achieving peace and security make support for the efforts to establish the WMDFZ seemingly unattainable. Fundamental changes and evolved geostrategic realities offer opportunities to advance the goals of the 1995 resolution. The dismantlement of Iraq's WMD programs following the 1991 war under international supervision and Libya's decision to renounce its WMD arsenals and pursue unilateral disarmament in 2003 are significant steps toward ridding the region of weapons, both conventional and unconventional. A combination of challenges and opportunities provide reasons to revisit the concept of the zone and suggest next steps that could lead to progress. The paper concludes that peace and security are both sides of the same coin and suggests practical mechanisms; inter alia, the establishment of a parallel process between efforts to establish a WMDFZ and peaceful relations in the Middle East.

### **The Proliferation Resistant Reactor**

*Dr. John Adams, Consequence Modeler, Atomic Weapons Establishment*

The Thorium Energy Amplifier is a type of Accelerator Driven Sub-Critical reactor which uses Thorium to breed its fuel. Thorium is not fissile and thus such reactors are often claimed to be proliferation resistant. This presentation aims to analyse this claim by making reference to the fuel cycle and by making comparisons to the standard Pressurised Water Reaction.

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**SESSION TWO: PERSPECTIVES ON EXTENDED DETERRENCE AND ASSURANCE**

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**Do Nuclear Security Assurances Curb Proliferation?**

*Dr. Philipp Bleek, Research Fellow, Belfer Center for Science and International Affairs, Harvard University*

Conventional wisdom among scholars and policymakers holds that if Iran obtains nuclear weapons, other regional states will do likewise. The same warnings are frequently heard with reference to North Korea. Similar arguments about “reactive proliferation” have been made throughout the nuclear age, but to date there has been little systematic study of the issue. Historically, one of the countries whose pursuit and acquisition of nuclear weapons was widely expected to prompt proliferation by others was Israel. The country deemed at greatest risk of attempting to acquire nuclear weapons in response to Israel was Egypt during the 1960s and 1970s, before the two sides made a “cold peace” in 1979. Egypt is both one of three countries most frequently forecast to be at risk of proliferating in response to Iran and shares important similarities with the others singled out as likely current or future Middle Eastern nuclear dominoes. So the reasons Egypt failed to do more in the 1960s and 1970s in response to proliferation by intense rival Israel can shed light on how likely Egypt and other countries are to reactively proliferate today and what levers policymakers in Washington and elsewhere might be able to employ to make such proliferation less likely. Among policymakers, U.S. nuclear security guarantees are widely believed to make allied states less likely to proliferate. Yet surprisingly little scholarly work has assessed this conventional wisdom. This paper examines whether and under what conditions security assurances are credible and therefore prevent allied nuclear proliferation. This analysis is of both scholarly and policy import. While there is a rich academic literature on deterrence, assurance gets short shrift. And the issue is increasingly relevant for policymakers seeking to prevent proliferation cascades should Iran and North Korea continue their nuclear activities. To analyze when great power security assurances prevent allied nuclear proliferation, the paper pairs large-*n* quantitative methods with qualitative case analysis. Hazard analysis, based on a new dataset of the proliferation behavior of all states from 1945 through 2000, is employed to examine whether security guarantees reduce proliferation proclivity and under what conditions more or less so. Preliminary findings suggest that nuclear security guarantees may be more effective at assuaging insecurity in the face of nuclear rather than conventional threats. These findings are fleshed out by exploring cases when U.S. and Soviet allies did—and did not—develop nuclear weapons and examining the role security assurances played.

**Non-Strategic Nuclear Weapons and NATO’s Strategic Concept Review**

*Mr. Grant Schneider, M.A. Candidate, The George Washington University*

With further reductions in strategic nuclear weapon arsenals, both in Russia and the U.S., the role of non-strategic nuclear weapons (NSNW) in the context of strategic stability in Europe has grown. Indeed, Russia’s declining conventional capability has caused it to rely more heavily on NSNW while many NATO allies see NATO’s NSNW as an increasingly important guarantor of the alliance’s cohesion. How the removal of NSNW in Europe would manifest itself and the implications of their removal are two questions which have not been adequately studied. This

presentation will evaluate paths to removing NATO NSNW (as well as options for dealing with Russia's NSNW arsenal) in terms of their effects on deterrence stability, alliance cohesion, and the advancement nonproliferation and disarmament. Their removal and its effects will be considered in the context of the upcoming NATO Strategic Concept Review. This presentation will argue that NATO NSNW have a much more modest deterrent value than is usually attributed when the array of nuclear forces deployed by the United States and Britain to protect the alliance is considered. Yet, some NATO allies worry about NATO's deterrent in the event of the removal of NATO NSNW vis-à-vis Russia's large NSNW arsenal. This presentation will examine paths to removal that effectively allay such concerns: what could NATO expect in return from Russia for the removal of NATO NSNW? What would be the nature of an agreement to limit or remove NATO NSNW? What is the role of the Conventional Forces in Europe treaty? Alliance cohesion is an important consideration when deciding how to remove these weapons: yet it is not a sufficient reason to continue with the status quo. The Strategic Concept Review provides the perfect opportunity to begin the process of removal of NATO NSNW while also considering the overall character of NATO's Strategic Concept with regard to nuclear weapons. NATO's past Strategic Concept, in dealing with nuclear issues, focuses almost exclusively on deterrence and defending against states which already have or may come to acquire nuclear weapons. The Strategic Concept review should seek to overlay the important nonproliferation objectives of all allies on that of NATO itself. Consideration of these concepts will require an overhaul of the traditional Cold War thinking laid out in the last Strategic Concept. Moving forward on these tracks with strengthen the alliance, increase stability and advance global nonproliferation and disarmament.

### **Underwriting Security Commitments without Reinforcing Perceptions of Nuclear Need**

*Mr. Mark Jansson, Deputy Director, Project on Nuclear Issues, Center for Strategic and International Studies*

The need for greater consistency and coherence in U.S. nuclear policy is palpable. And it is a need that the current administration has taken very seriously as it has committed substantial effort to meeting the challenges posed by the threat of nuclear terrorism, nuclear proliferation, and possible aggression by nuclear-armed states. Unfortunately, there remain inconsistencies that cause different aspects of U.S. nuclear policy to work at cross-purposes. For instance, in the past, the U.S. has developed "extended deterrence" arrangements in Europe and East Asia as a means of obviating the perceived need of its allies to develop nuclear weapons to defend against attacks from larger powers. In the Cold War context, it was an understandable and overall effective means of reducing the spread of nuclear weapons. However, these arrangements have long outlived the threats that they were originally designed to address. While it is true that, in some cases, new security problems have emerged that at-least arguably justify the need for the U.S. to continue to extend nuclear protection to these allies, these problems are increasingly difficult to distinguish from other, perhaps equally compelling, security problems in regions (e.g. the Middle East) where nuclear protection – either through states' acquisition of their own weapons or through extended deterrence arrangements – would be extremely problematic. Making matters worse, high-ranking U.S. officials have stated explicitly that Iran's acquisition of nuclear weapons would result in a "cascade" of nuclear proliferation in the region, and have admonished

China and North Korea that the latter's nuclear program may eventually trigger the same result in East Asia. The lesson following from the words and actions is clear: acquiring the protection of nuclear weapons is an appropriate, if not *automatic*, response to the problems posed by a rival with nuclear weapons or even one with latent nuclear capability. But this message is directly at odds with the U.S.'s broader efforts to reinvigorate the nonproliferation regime and demonstrate its commitment to fulfilling its obligations under the NPT as well as with its stated policy of reducing the role and prevalence of nuclear weapons worldwide. Applying concepts from the conflict resolution literature, which offers analytic frameworks that elucidate the roles and interactions among different problem solving methods, can be useful in developing a construct from which a more consistent, cogent and compelling nuclear policy, a policy that makes equal sense to those who have nuclear protection and those who do not, can be derived and articulated. Doing so could bode well for the long term success of the U.S. and other states in preventing nuclear proliferation and, ultimately, nuclear conflict.

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**SESSION THREE: NUCLEAR ASPECTS OF TERRORISM AND COUNTERTERRORISM**

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**The Future of Terrorism with a Nuclear Iran**

*Dr. Tom Tierney, Physicist and Senior Project Leader, Countering Terrorist Tactics Program Office, Los Alamos National Laboratory*

The potential of an Iranian nuclear deterrent in combination with their current sponsorship of terrorism poses an unprecedented threat to peace, freedom, and democracy. The capability to produce a nuclear weapon alone is insufficient grounds to condemn any country; but, Iran's aggressive posture is a driving factor behind the international community's concerns over the intentions and implications of its nuclear program. Certainly a nuclear Iran would serve as a strong motivation for other Middle East nations to seek weapons of mass destruction. Of equal concern are the potential terrorism implications of an Iranian nuclear deterrent.

In its 2009 *Country Reports on Terrorism*, the U.S. Department of State labels Iran as the most significant state sponsor of terrorism. In the absence of a strategic nuclear deterrent, Iran uses terrorism to preserve its regime and *deter* attack by the superior conventional forces of Israel and western nations. In February, Iranian President Mahmoud Ahmadinejad warned, "If someone wants to act against Iran ... there will be a counteraction that will make them regret [such action]."1 In consideration of Iran's strategic *terror* deterrent, Ahmadinejad's ambiguous threat likely includes increased terrorist activities in addition to other actions. Iran also uses terrorism as a means to execute its foreign policy interests, including influencing neighbors in the Middle East, with limited fear of retaliation. With a nuclear deterrent backing it up, Iran might sponsor riskier, higher impact, and more deadly attacks against Israel or western interests. The 2009 U.S. Central Intelligence Agency assessment to Congress reported, "Iran continues to develop a range of capabilities that could be applied to producing nuclear weapons, if a decision is made to do so." In the eyes of his peers, Ahmadinejad's decision to develop nuclear explosives may be justifiable when facing threats of military action by superior conventional forces. The struggle against the emerging threat of high impact terrorism is inextricably dependent upon diplomatic

efforts to discourage Iran from seeking to possess nuclear weapons. The future of peace and stability in the Middle East and perhaps worldwide is strongly dependent on Iran's perception of sovereignty and self-determination. While Iran's insecurity can only be resolved internally, the U.S. and its allies can play an important diplomatic role in influencing their perception of foreign interests.

### **Understanding the Nuclear Threat: The Integration of Science with Policy and Governance**

*Mr. Dan Dalton, Interagency and International Section Lead, Office of Nuclear Counterterrorism, National Nuclear Security Administration*

President Obama has offered a vision of a world without nuclear weapons and stated that the most "immediate and extreme" threat to global security today comes from nuclear terrorism and nuclear proliferation. To mitigate these risks and move toward eventual nuclear abolition, nuclear threat reduction efforts and international work to counter nuclear threats must be appropriately informed by a thorough scientific and technological understanding of the full range of nuclear threat devices. Understanding the nuclear threat is the key to nuclear threat reduction. The United States must move toward a more integrated approach for countering nuclear threats to prevent or, if prevention fails, respond to a nuclear terrorist attack or loss-of-control of a nation-state nuclear weapon. This is best accomplished through an integrated, whole-of-government approach and close cooperation and collaboration with international partners. Policies and guidance for nuclear threat reduction (NTR) and countering nuclear threats (CNT) must be underpinned by accurate and timely scientific and technical (S&T) knowledge and research and development related to understanding nuclear threat device designs and how these affect all aspects of countering nuclear threats, including: material protection and security, detection, intelligence, interdiction, diagnostics, emergency response/disablement, forensics and attribution. Science and technology must inform intelligence, operational planning and related policies. Failure to integrate science and technology into the intelligence process and operational planning will result in uninformed policies, wasted resources and, ultimately, a potential failure to prevent a proliferant event or nuclear terrorist attack and the lack of an effective response. The United States must ensure that a thorough understanding of the threat informs all policies and activities to prevent a nuclear terrorist attack and stop or slow the proliferation of nuclear weapons.

### **Nuclear Weapon Technology Close Kin: How the Non-Proliferation and Nuclear Counterterrorism Programs Leverage the Nuclear Weapons Complex Facilities and Expertise**

*Mr. Matt Cowan, Deputy Program Manager, Defense Technologies Engineering Division, Lawrence Livermore National Laboratory*

The NNSA Non-Proliferation and Nuclear Counterterrorism programs utilize key expertise and facilities originally developed for the US nuclear weapon mission. The associated facilities and infrastructure are also managed and funded solely by the nuclear weapon program. Proposed infrastructure downsizing, modernization, and recapitalization efforts are optimized around the future needs of a reduced capacity weapons complex. The infrastructure decisions may greatly affect the Non-Proliferation and Nuclear Counterterrorism programs' capability while not

necessarily reflecting their needs. In light of the changing priorities illustrated by the most recent Nuclear Posture Review, I will outline how the facilities and expertise of these programs intersect and evaluate potential impact from proposed infrastructure downsizing on the NNSA Non-Proliferation and Nuclear Counterterrorism programs.

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#### SESSION FOUR: MAPPING NEW DIRECTIONS FOR THE NUCLEAR ENTERPRISE

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### **The Unpredictable and Nuclear Devices**

*Dr. Steve Hughes, Senior Scientist, Computational Physics Group, Atomic Weapons Establishment*

The future is always uncertain: emerging technologies, crisis situations and natural disasters represent a threat to stability and peace in the world. For example in the past few years there have been a number of major natural disasters, significant economic turmoil and several regional conflicts. The danger of escalation, of more widespread or catastrophic events is troubling to many people and a strong theme in popular culture. History and science suggest this fear is not without foundation, but what can really be done to mitigate or prevent these situations? Reactions to unusual situations can be hard to understand even when a single individual is involved; when governments or other decision-making bodies are concerned, this complexity is magnified. When events develop rapidly on the world stage there can be significant danger of ensuing catastrophe and destabilisation. These situations can be extremely difficult to plan for these events as they are either very low probability or essentially unpredictable. It is argued that that it may be possible to apply some level of rational evaluation as to which scenarios deserve more attention in policy, and, as a potentially game-changing technology, that nuclear weapons in the 21<sup>st</sup> century should be considered in this context.

### **Towards an Integrated Nuclear, Space and Cyber Policy Framework**

*Mr. Jason Wood, Policy Analyst, Science Applications International Corporation*

There is a direct correlation between the safety, security, and reliability of U.S. nuclear weapons and the ability to counter threats in the cyber and space domain. As the capacity to defeat cyber and space threats increases, so too does the overall safety, security, and reliability of the U.S. nuclear deterrent. This same correlation holds true regarding U.S. counter-WMD capacity. While the recent reorganization of OSD by the Obama administration is a positive step towards institutionalizing this relationship, more must be done across the U.S. defense, intelligence, and homeland security community to establish oneness-of-thought on nuclear, cyber, and space issues.

### **The Nuclear Weapons Budget: How Much is Enough?**

*Mr. Stephen I. Schwartz, Editor, The Nonproliferation Review, James Martin Center for Nonproliferation Studies, Monterey Institute of International Studies*

Two key questions must be asked about the \$180 billion in projected nuclear weapons spending outlined by the Obama administration earlier this year: How does this compare to spending in

previous years, and how much would have been spent absent a new master plan and efforts to obtain at least 67 votes and secure passage of New START and the CTBT? There is no easy way to answer those questions because there has never been a nuclear weapons line item in the federal budget. Consequently, no one in the government can say with certainty how much has been or is being spent on the entire nuclear weapons program. In June, for example, the GAO reported that, “NNSA cannot accurately identify the total costs to operate and maintain weapons facilities and infrastructure because of differences in sites’ cost accounting practices.” As a result, “The total cost to operate and maintain weapons facilities and infrastructure likely significantly exceeds the budget request... submitted to Congress for fiscal year 2009.” Similar problems almost certainly exist within the DOD, which is responsible for more than three-quarters of all current nuclear weapons expenditures. For nearly 50 years, the only detailed measure of DOD nuclear weapons spending has been Major Force Program 1 (MFP 1), which includes most but not all expenditures for strategic nuclear forces. According to the DOD, for fiscal 2010, MFP 1 amounts to \$12.8 billion. But this figure—which is \$2.2 billion higher than the average annual spending for the past decade—does not include research and development, command, control, and communications, some operations and maintenance costs, or any costs associated with nonstrategic nuclear weapons. Neither does it include any classified programs, including the substantial intelligence-related costs associated with the nuclear arsenal. Elected officials should know with some precision how public funds are being spent, especially on matters of national defense and particularly in a time of fiscal austerity. But when it comes to nuclear weapons, this is not possible. To remedy this situation, Congress should require the executive branch to prepare and submit annually, in conjunction with the annual budget request, an unclassified and classified accounting of all nuclear weapons–related spending for the previous fiscal year, the current fiscal year, and the next fiscal year. The DOD should project its nuclear weapons–related spending five or six years into the future. A senior White House official should oversee this annual exercise, in conjunction with relevant officials of the Office of Management and Budget and senior budget officials of key departments and agencies. Once completed, Congress should ask the GAO to audit the nuclear budget for accuracy and completeness, and then ensure that the executive branch incorporates its recommendations for future years. To the maximum extent possible, this accounting should be unclassified, just like the latest Nuclear Posture Review. There is little if any need to keep secret the specific amounts of money being expended for nuclear weapons programs. If the Obama administration can reveal for the first time the total number of nuclear weapons in the arsenal, there’s no reason why the ongoing cost of these weapons must remain classified, or at least largely inaccessible. Proponents of increased spending should support such a measure, not just because it’s good government but also because it will help them monitor spending and buttress their arguments. Similarly, nuclear critics and fiscal conservatives will be better able to identify overruns and waste and demonstrate how reductions in the size of the arsenal, or changes in how weapons are deployed, can help reduce costs. Once a framework is agreed upon, it will be a simple matter to plug in the new numbers each year. Within a few years, trends will begin to emerge, which could lead to more insightful and informed debates and rational decisions about our nuclear spending priorities and the continuing role nuclear weapons should play in our national security posture.

**Weapons Design vs. Weapons Maintenance: Are we looking for the right people?**

*Mr. Joel B. Forrester, Research Scientist, Pacific Northwest National Laboratory*

The Obama administration last year sent a fairly clear signal that the long-argued proposal to develop a new warhead design for the aging U.S. nuclear arsenal, via the controversial Reliable Replacement Warhead (RRW) program, is functionally dead by zeroing out RRW funding in the Department of Energy's fiscal year 2010 budget. While the squashing of the RRW does not equal the death of the issue, the likelihood of the United States developing a new warhead design does not appear very great. Assuming the U.S. maintains the status quo, i.e., maintaining the existing stockpile of warheads and funding new Life Extension Programs (LEP) for the nuclear-capable delivery systems, the onus will be upon the NNSA to staff the technical workforce responsible for maintaining the weapon components. Recruiting and training new weapons designers has been the focus of articles and discussions for over a decade, but years later we continue to hear, repeatedly, the warning voice of impending loss of capability. If, however, we consider that there is a fundamental difference between the task of designing a new nuclear weapon and maintaining existing designs, the recruiting challenge changes. The published voice of concern is much quieter on the issue of skilled maintenance scientists and engineers. It is important to examine and understand the basic differences between design and maintenance activities. These differences are not unique to the nuclear weapons issue. While certainly there are sundry differences between the two task, it is necessary to examine and emphasize that some of these discrepancies are actually *real* and consequential, while others may be a matter of perception. Most, if not all technical fields see some clear delineation between creation and maintenance activities. I compare personal experiences in studying and planning maintenance responsibilities for hardware and software designed for the International Monitoring System operated by the CTBTO Critical to solve the recruitment challenge is modifying the long-held conviction that we must recruit only the wonkiest or most technical and scientifically-curious scientists into the nuclear weapons program. This may be the case when considering design, but this is certainly not so when seeking scientists and engineers to commit themselves to the long-term reliability and maintenance of existing warhead designs. I have been told that weapons designers are high-level integrators capable of cutting across disciplines who rely on cutting-edge specialists that drill down into the nitty-gritty. When looking for weapons maintenance scientists the case should be made that they are also best chosen to be integrators, but recognizing the need for planning, management, and other “soft” skills to be of greater importance than pure scientific curiosity. Within the domain-specific journals and online publications of the individual fields of science, it does not take much searching to find articles aimed at and questions posed by those seeking a career outside the traditional research path. Increasingly, young science graduates from both undergraduate and graduate programs emerge disillusioned or downright averse to a life in the lab. Some of this can be put down to apathy of modern university students or lack of rigor in the curriculum. Regardless of the cause, students are eschewing research careers for the appeal of business or management paths. Rather than characterize the current generation of scientist as possessing a broader, shallower knowledge base, I argue that an increased knowledge of advanced business systems and big picture view prepare them well for a career in weapons maintenance. I do not conclude that the U.S. weapons community has been recruiting the wrong people, but offer that the struggle to recruit appropriately skilled individuals stems in part from trying to recruit only ONE TYPE of scientist – namely, those well-suited and desirous to become DESIGNERS – while neglecting those perhaps best suited to the task at hand. We need to look now for MAINTAINERS as well.

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**SESSION FIVE: THINKING AHEAD ABOUT STRATEGIC STABILITY**

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**Getting the Balance Right: U.S. Missile Defense and Nonproliferation**

*Mr. Andrew Futter, PhD candidate, Department of Political Science and International Studies, University of Birmingham*

The decision to replace rather than cancel missile defence in Europe, the strategic thinking contained in the Ballistic Missile Defense and Nuclear Posture Review's, and the determination not to include limits on US missile defences in the New START treaty, all suggest that ballistic missile defence is a key and entrenched part of the Obama administration's national security agenda. Indeed the proliferation of ballistic missile technology, the emergence of rogue states interested in acquiring or potentially using nuclear weapons, along with significant progress that has been made in BMD technology, all suggest that missile defences have an important role to play in contemporary US security strategy. However, conventional strategic thinking would suggest that this normalisation of missile defence as a component of US policy is fundamentally at odds with the President's much publicised goal of achieving a 'world free of nuclear weapons' and antithetical to the wider US non-proliferation agenda. As a result, it is important to re-consider the relationship between nuclear weapons and ballistic missile defence in the Post-Cold War, post 9-11 world, in order to see whether this zero-sum thinking can be overcome. The central contention of this paper is that if nuclear non-proliferation is to remain a credible goal of US national security and non-proliferation policy then the Obama administration will probably have to formally limit its ballistic missile defence plans at some point in the near future. However, it does not suggest that missile defences do not have an important role to play, only that they must be balanced with wider international stability and strategic relations. As such the paper argues that a balance needs to be struck between using BMD to bolster security vis-a-vis 'rogue states' like North Korea and Iran, and making sure that such deployments do not undermine relations with key strategic competitors such as Russia and China. The paper therefore argues that well balanced strategy can offer the opportunity to negotiate further arms cuts with Russia, enhance US homeland and extended deterrence, and help create the conditions conducive to a credible non-proliferation agenda. Whilst this policy is far from a panacea, and will not lead directly to global zero, it will increase international stability and US security, strengthen non-proliferation efforts, and may provide a springboard from which the next round of nuclear disarmament agreements can be launched.

**Indian Nuclear Force Modernization and Implications for Strategic Stability**

*Mr. Frank O'Donnell, Research Assistant and MSc Strategic Studies Student, University of Aberdeen*

Indian nuclear force planners are presently assured of the stability of mutual nuclear deterrence with Pakistan. Government statements and strategic commentators illustrate an increasing focus on China in Indian strategic nuclear thought. The intended future bulwark of the Indian nuclear force, constituted of the SSBN fleet and the Agni-III (3000km-range) and Agni-V missiles, is internally assessed in this context. India is building its first SSBN naval base, at Visakhapatnam on its east coast. An eventual fleet size of at least five SSBN boats is projected. Indian government briefings and domestic analysts depict the Indian SSBN platform as a response to

the new *Jin*-class Chinese SSBN fleet and the Chinese SSBN base on Hainan Island. Indian SSBN boats are most likely to be armed with the K-15 SLBM. This missile has a range of only 700km, meaning that Indian boats will have to travel close to China to bring significant east and south coast Chinese targets into range. This means that Indian fears of Chinese nuclear naval competition could be self-fulfilling. The Agni-III and Agni-V missiles are developed and justified in domestic narratives by reference to China. Indian strategic fears of dark Chinese nuclear intentions may be inflated. The fielding of new nuclear capabilities targeted explicitly against China, in the absence of regional strategic nuclear dialogue, threatens tension in the China-India-Pakistan nuclear complex. Chinese nuclear threat perceptions are concentrated principally on a perceived American nuclear threat. It is in American interests to ensure China adheres to a nuclear force deployed with the lowest possible number of active delivery platforms. The rising regional strategic salience of Indian nuclear force modernization may elevate the perceived Indian nuclear threat in Beijing. This could potentially contribute to expanded Chinese arsenal modernization, further-reaching SSBN deployments, and new warhead assembly programmes. These new Indian nuclear capabilities are also being developed in the context of the recently proposed Chinese reactor sale to Pakistan. This is widely seen as an attempt to correct a perceived South Asian nuclear imbalance in fissile material production and nuclear infrastructure capabilities. Further Chinese nuclear support to Pakistan involving military technology also cannot be ruled out. These developments would have damaging impacts on American efforts at strategic reassurance of regional allies and at lowering global warhead and fissile material stockpiles. Regional nuclear threat perceptions can be inflated by a lack of clarity regarding mutual nuclear intentions and the operational role of nuclear weapons in military strategies. To reduce the risk of inflated perceived nuclear threats driving destabilising regional nuclear developments such as those above, Washington should begin to explore possibilities for regional nuclear strategic dialogue with Beijing, New Delhi and Islamabad. This dialogue could be initiated and conducted privately among government officials. If invitations to official regional strategic discourse are rebuffed, a Track 2 process could be initiated as a first step. In promoting discourse on nuclear doctrine and intentions, such dialogue could inform threat assessments and reduce the risk of regional nuclear competition generated by mutual misperception. As the India-China-Pakistan nuclear complex is entering a new period of uncertainty, it is in Washington's interest to ensure India's transition to a nuclear triad does not place regional strategic stability at risk.

## **Nuclear Crises**

*Mr. Paul Burton, Radiation Sciences, Atomic Weapons Establishment*

Over the past 50 years we have seen a number of crises, both inadvertent and deliberate, develop between nuclear powers. My aim with this presentation is to seek common patterns in the development and resolution of such crises and to apply this analysis to potential future scenarios; while seeking to establish the types of international frameworks which might prevent, or at least mitigate the effects of, such crises.