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Preventing nuclear terrorism
Australia's leadership role

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Executive summary

No country can afford to be complacent about the risk of nuclear and radiological terrorism. Even countries with minimal or no nuclear infrastructure could fall victim to groups who succeed in procuring materials from poorly secured foreign facilities for use against prestige targets.

Although they should be kept in perspective, Australia faces internal and external risks in this area. Its nuclear infrastructure is modest for a country of its size, but Australian nuclear facilities do exist and at least one domestic group has shown interest in targeting them. While the absence of a land border makes Australia less vulnerable to external threats, its busy ports and proximity to weakly governed spaces in Southeast Asia, where nuclear infrastructure is growing and security culture lagging, mean that the potential for external attacks also needs to be taken seriously. Moreover, a nuclear or radiological incident in Southeast Asia would not be without consequences for Australia.

Because, so far, no successful nuclear or radiological terrorist attacks have been conducted anywhere in the world, the risks can appear abstract and overblown. They aren't. If terrorists were able to overcome the still relatively significant challenges involved in the fabrication and successful detonation of an improvised nuclear device, the consequences could be catastrophic. Of course, much more likely would be an attack involving a radiological dispersal device, which would be far less lethal, but would have important health effects and cause major social and economic dislocation.

Australian nuclear experts are well aware that they can't guarantee that such attacks will never occur at home or abroad—the risks will exist as long as nuclear technologies remain a part of our lives. But they're also conscious of the steps they can take to make nuclear and radiological terrorism less likely. Over the years, they've honed their expertise and transformed Australia into a world leader in nuclear security practices, both in securing materials and facilities at home and in helping to build nuclear security capacity abroad. They've learned key lessons along the way, including how to successfully transfer critical skills to neighbouring states, how to help national and international organisations develop and improve nuclear security mechanisms and guidance, and how to build international consensus on the need to take nuclear terrorism risks seriously.

These are vitally important activities with implications for Australia's national security, for that of its near neighbours, and for the rest of the world. Yet they're not valued as much as they should be in Australia's decision-making circles. A lack of publicity for Australia's nuclear and radiological security work means that most Australians, including many in the political and strategic realms, don't fully appreciate the nature of global nuclear and radiological threats or the extent to which Australia's expertise and outreach efforts are respected and relied upon around the world (as are Australia's efforts in nonproliferation and disarmament). This helps explain why one of Australia's flagship projects—the Regional Security of Radiological Sources Project—was recently cancelled. There's a disconnect between Australia's nuclear security champions, who operate in the official and non-government sphere, and Canberra's political elite.

The new Abbott government should address this problem by launching a nuclear security strategy that would require a modest financial output (about $2 million per year) and yet reap significant national, regional and international rewards. The strategy should consist of three main initiatives:

- *Relaunch the Regional Security of Radiological Sources Project*. This project was the most advanced of its kind and proved extremely successful in all respects, so much so that the US National Nuclear Security Administration and the International Atomic Energy Agency (IAEA) saw it as a trailblazer. Time is of the essence: the sooner it's revitalised, the better, so that the network it's developed since 2004 won't have broken up.
- *Take the lead in creating a new regional mechanism centred on improving nuclear security in the Asia–Pacific more generally*. This should be a multistakeholder effort conducted in close collaboration with the IAEA, domestic nuclear agencies across the region and the nuclear security centres of excellence in Japan, South Korea and China. Efforts should focus on capacity building in Southeast Asia—particularly Vietnam, which is set to develop a relatively ambitious nuclear power program, and Indonesia, Malaysia and Thailand, which have ambitions to follow suit.
- *Start a public education campaign to raise awareness of nuclear security challenges and opportunities*. The campaign should be run both in Australia and at the international level, making full use of Australia's domestic agencies as well as the IAEA and the Nuclear Security Summit process.

These initiatives would serve the triple purpose of helping to reduce nuclear dangers, achieve Australia's broader strategic objectives, and fulfil its international obligations—and all at a very modest cost. Nuclear security is an area that offers Canberra a 'fair go' to turn a small investment into an ability to exert leadership in the international arena and, by doing so, strengthen ties with key allies and new partners. If Australia fails to sustain this leadership role, it will become increasingly difficult to justify its permanent seat on the IAEA Board of Governors in Vienna, losing which would diminish Australia's global influence, undermine its nuclear industry and expertise, and leave the Department of Foreign Affairs and Trade scrambling for periodic re-election to the board.

Pathways to nuclear terrorism

> Nuclear terrorism is one of the most serious threats of our time. Even one such attack could inflict mass casualties and create immense suffering and unwanted change in the world forever. This prospect should compel all of us to act to prevent such a catastrophe.
>
> —UN Secretary-General Ban Ki-moon, 13 June 2007

Since the dramatic attacks of 11 September 2001 against the US, the spectre of nuclear terrorism has been ever present. Although concerns about this threat date back to the early years of the nuclear age, the 9/11 events and subsequent discoveries that terrorists had been actively seeking to acquire nuclear technologies have suggested that a nuclear terrorist attack is becoming more likely. This has brought home the idea that this scary hypothetical threat could soon become reality. For good reasons, the threat of nuclear terrorism has since received much attention from the international community.

There are three pathways to nuclear terrorism. The most worrying involves the theft or acquisition of a nuclear weapon from existing military stocks. A second involves the theft and trafficking of radioactive or nuclear materials by terrorists, leading to the production and detonation of an improvised nuclear device (IND) or radiological dispersal device (RDD). A third is a terrorist attack or sabotage on a facility or on transportation, leading to a release of radioactive material.

These pathways exist wherever nuclear and radiological materials are in use. Of course, nuclear security risks are highest in states that possess nuclear weapons, which is one of the reasons why nuclear security is inextricably linked to nonproliferation and disarmament. Risks also increase dramatically when states embark on nuclear energy programs, because the development of nuclear power massively increases states' nuclear infrastructure, much of which can become a target for theft, attack or sabotage. This should be a concern for all states in the Asia–Pacific because this region is experiencing one of the most rapid expansions of nuclear energy and the use of radioactive sources in the world, including in Southeast Asia, where many countries lack a security culture, are known to have lax export controls, and struggle to implement high standards of nuclear security due to serious capacity challenges.

The main worry about the theft and trafficking of nuclear and radiological materials is that they will end up in the hands of terrorist groups, who will use them in INDs or RDDs. Even in the case of an RDD, which is a more likely scenario but would be much less lethal than an IND, radioactive contamination in a densely populated area could have serious economic and social consequences. Although a successful RDD attack has never been perpetrated, there's evidence that terrorists have invested in such devices: Chechen separatists were involved in two incidents involving radioactive materials in November 1995 and December 1998, and more recently intelligence agencies in mainland Europe, Thailand, the UK and the US have managed to foil RDD plots before they reached fruition.

In 2012, the International Atomic Energy Agency (IAEA) Incident and Trafficking Database reported 160 incidents involving the illegal trade and movement of nuclear or other radioactive material across national borders. Of those, 17 involved possession and related criminal activities, 24 involved theft or loss and 119 involved other unauthorised activities. Two incidents involved highly enriched uranium (HEU) in unauthorised activities. There were also three incidents involving dangerous Category 1–3 radioactive sources, two of which were thefts. Information reported to the database demonstrates that:

- the availability of unsecured nuclear and other radioactive material persists
- although effective border control measures help to detect illicit trafficking, effective controls aren't uniformly implemented at all international border points
- individuals and groups are prepared to engage in trafficking this material.

The possibility of RDD or, worse, IND detonation is real and, while the risks need to be kept in perspective, they need to be taken seriously.

One of the most worrying recent cases of illicit trafficking involving HEU occurred in June 2011 in Moldova, where officials arrested six people with a quantity of weapon-grade material. The group claimed to have access to plutonium and up to 9 kilograms of HEU, which they were willing to sell for $31 million. A serious buyer, reportedly of North African origin, appears to have been involved and remains at large.

Research reactors are considered vulnerable to thefts of nuclear and radiological materials because they're often located on university campuses or in larger scientific research centres, which are relatively open to the public or have many users and visitors. Moreover, other than the amended Convention on the Physical Protection of Nuclear Material, which has yet to enter into force, there's no internationally binding requirement for securing these facilities. Since 2003, however, the US and the IAEA have been working with various countries to reduce the risks associated with research reactors. Many countries with HEU-fuelled research reactors, including some in Australia's near neighbourhood, have taken part in securing HEU and converting the reactors to use low-enriched uranium (LEU). In particular, HEU has been removed and secured from Indonesia, the Philippines, Thailand and, most recently, Vietnam. Of course, LEU-fuelled research reactors remain a target for terrorists who wish to spread ionising radiation or damage a symbolic facility representing technological progress, and most research reactors have substantial quantities of sealed sources that are potentially vulnerable to theft.

The potential for the sabotage of research reactors and nuclear power plants by terrorist groups also must be taken seriously. Saboteurs could crash an airplane into a nuclear power station, use truck bombs, conduct commando attacks by land or water or mount cyberattacks, and rely on insider assistance for such deeds. Some of these scenarios might seem far-fetched, but the 9/11 attacks demonstrated that a determined terrorist organisation is capable of employing sophisticated terror tactics. Failure of imagination is not an option: the world must prepare for nuclear 'black swans'.[1] Significantly, according to the 9/11 Commission Report, Mohammed Atta, one of the cell leaders of the 9/11 attacks, had expressed interest to the al-Qaeda leadership in crashing an aeroplane into a nuclear power plant.[2]

Australia has direct experience of nuclear sabotage threats. In November 2005, a plan to target Australia's nuclear reactor at Lucas Heights was exposed by the Australian media.[3] The suspects—a group of Melbourne- and Sydney-based jihadists—had undergone terrorist training on two country stations outside the town of Bourke in New South Wales. According to reports, police had been tracking the group for some time, intercepting phone calls in which its members

expressed their desire to die for jihad, and to cause maximum damage to Australian infrastructure and lives in the process. Three members of the group, some of whom had links to terrorist suspects overseas, were stopped near Lucas Heights nearly a year before their arrest. When questioned by police about what they were doing, all three gave different versions of the day's events. Suspicions were heightened when investigators discovered that an access lock in the vicinity of the outer security fence had been cut. Later, it was revealed that the group had stockpiled weapons, bought explosives and other bomb-making materials, and had scoped out other high-profile Australian targets as well as Lucas Heights.

Incidents of this kind, which are by no means rare, are documented in a restricted-access database run by academics at Stanford University. The database shows that incidents continue despite the tightening of nuclear security standards, including in countries that possess extensive nuclear facilities and nuclear weapons stockpiles. More recently, Anders Behring Breivik, the Norwegian who detonated a powerful bomb in Oslo before shooting dead 70 young people on a small island, posted detailed instructions about how to use weapons of mass destruction (WMD) on the internet before his rampage. Included in his 1,500-page manifesto were specific recommendations on how to sabotage nuclear power plants.

The crashing of a plane into a nuclear power station is a relatively low risk in countries where the airspace around such facilities is carefully monitored. Most of the structures around nuclear reactors, however, aren't built to withstand the impact of a large airliner.[4] Truck bombs also have the potential to cause devastating damage, as demonstrated by the 1983 truck bombs in Lebanon and the 1993 attack on the World Trade Center. Had those attacks been targeted at nuclear power plants, the consequences could have been far more extreme. This is recognised by the US and others. The US includes this mode of attack, along with commando and waterborne attacks, in its 'design basis threat', or DBT (a DBT is a worst-case threat assessment method developed by IAEA experts).

In addition to external attacks, nuclear facilities are potentially vulnerable to 'insider threats'—personnel who work at the plants, have expert knowledge about them, and can assist would-be attackers without raising the suspicions of their colleagues. Most studies that explore potential attacks on nuclear facilities have focused on direct assaults on buildings rather than sabotage from within, but the vulnerabilities exposed to insider threats are immense. Even in the US, where sensitivity to nuclear terrorism is greatest and numerous steps have been taken to address the insider threat problem (including a strict 'fitness for duty' program and a dedicated 'insider threat mitigation program'), there's a high turnover of staff at nuclear power stations and lax background checks on staff have been reported.[5]

Recently, concerns have been growing that the 2011 nuclear accident at Japan's Fukushima Daiichi power plant may have given terrorist groups a tip on how they could use relatively simple methods to target a nuclear plant in a way that would wreak havoc and dislocation and instil widespread fear. Activities such as cutting outside power to a reactor, damaging a site's diesel generators or otherwise degrading a reactor's cooling system could potentially cause a Fukushima-style meltdown. In the words of Igor Khripunov and Duyeon Kim, 'a terrorist version of Fukushima is plausible—with all the human suffering, economic dislocation, and national humiliation the March 2011 cataclysm entailed.'[6]

As nuclear power plants rely increasingly on digital control systems, they may become more vulnerable both to external hacking and to insider sabotage. Precedents exist for this security challenge. In 2003, a computer virus penetrated the network at the Davis Besse Nuclear Power Plant in Ohio. Luckily, the plant was shut down at the time, but it was vulnerable because technicians hadn't installed a Microsoft security patch. Fortunately, fairly extensive cybersecurity requirements are now in place in most US nuclear power plants, and more are being implemented, but many power plants around the world are yet to do so and remain potentially vulnerable to cyberattacks until then.

Radioactive waste sites, as well as radioactive waste in transit, are also potential targets for saboteurs. Spent fuel from power stations contains very heavy radioactive elements, including plutonium. This ultra-hazardous material, most of which remains dangerously radioactive for a period of 10,000 years, is cooled in ponds and then either sent to an underground depository to be buried irreversibly (as is the case in Finland and Sweden) or recycled

in order to utilise the valuable plutonium content (a process pioneered and then abandoned in the US and now used in France, Russia, Japan and elsewhere). Both approaches pose potentially significant safety and security challenges at every stage, especially when the high-level waste is transported to depository sites or to reprocessing facilities in journeys that can involve the transcontinental movement of the material.

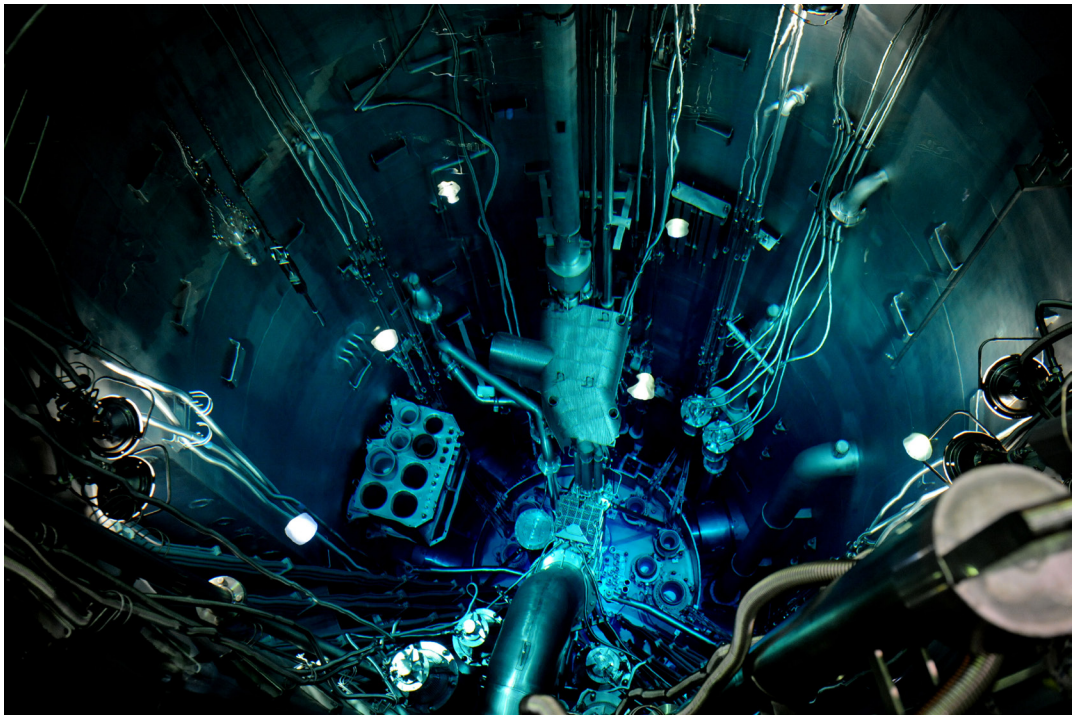
Australia and the threat of nuclear terrorism

The likelihood that Australia will be subjected to nuclear or radiological terrorist attacks is low. However, it must be taken seriously because there are risks wherever nuclear facilities exist and where nuclear materials are in use. Moreover, even countries with minimal or no nuclear infrastructure could fall victim to internal or external groups that succeed in procuring materials from poorly secured foreign facilities for use against prestige targets. While the absence of a land border is a distinct advantage for Australia, its busy ports and proximity to weakly governed spaces in Southeast Asia, where nuclear infrastructure and the use of radioactive sources are growing and security culture lagging, should be cause for concern.

Nuclear facilities and materials in Australia

Australia's nuclear infrastructure is modest for a country of its size, development and wealth. Australia possesses only a small quantity of the weapons-grade HEU that could be used in the construction of an IND. Over the years, most of its HEU has been shipped to the US under the Global Threat Reduction Initiative of the US National Nuclear Security Administration. Since 1998, more than 100 kilograms of US-origin HEU fuel has left Australia under these arrangements. In the last major shipment, which took place in 2009, 14.5 kilograms of HEU was repatriated to the US, leaving less than 5 kilograms remaining on Australian territory.[7] Of note, the IAEA considers that a 'significant quantity' of nuclear material (that is, the approximate amount for which the possibility of manufacturing a nuclear explosive device cannot be excluded) is reached with HEU containing 25 kilograms of uranium-235 or 8 kilograms of plutonium.[8]

Australia has one research reactor: the 20-megawatt OPAL (Open Pool Australian Lightwater) reactor at Lucas Heights about 35 kilometres southwest of the Sydney CBD. It's designed to run on LEU, and has done so since commissioning commenced in August 2006. Other national facilities include



The OPAL nuclear research reactor at Lucas Heights in Sydney, 7 October 2008. AAP Image/Tracey Nearmy © AAP 2008.

a national medical cyclotron, used for research and the production of medical isotopes; a gamma technology research irradiator, used for commercial irradiation services and research; and other related equipment, such as particle accelerators and X-ray and electron microscopy equipment.

The purpose of Australia's nuclear facilities is to conduct scientific research and produce radioisotope medicines, rather than to research nuclear fuels. This is because Australia has so far opted not to develop nuclear power. If that decision were overturned, Australia's nuclear infrastructure would expand and, with it, the nation's vulnerability to nuclear threats. To date, there's been limited enthusiasm for nuclear energy development in Australia, despite the country's massive natural uranium deposits and the arguments put forward by the World Nuclear Association, which lists Australia as a candidate for future nuclear power production. Negative public responses to the last major domestic policy review, which was conducted in 2006, exposed the extent of nuclear fears and the depth of resistance to nuclear energy among Australians.[9] While John Howard, the former leader of the conservative-oriented Coalition government, was known to endorse the nuclear energy path, the subsequent Labor government steadfastly opposed it under the leadership of prime ministers Kevin Rudd and Julia Gillard. It remains to be seen whether the return to Coalition government will see a corresponding return to nuclear energy advocacy among Canberra's political elite, or whether the nuclear safety and security concerns stemming from the Fukushima nuclear disaster will keep the issue on the backburner. Newly elected Prime Minister Tony Abbott is known to favour the nuclear path. Although he avoided divisive nuclear issues during his election campaign, he previously described nuclear power as 'the only realistic way' for Australia to cut its carbon emissions while maintaining living standards, and he called for a resumption of the national debate on the issue.[10]

Compared to the waste generated by nuclear power plants, the waste from Australia's existing nuclear facilities poses limited risks. Most of the radioactive waste material that's been accumulating over the past 50 years is classed as intermediate- and low-level. According to official figures, Australia holds 435 cubic metres (the volume of about 8–10 shipping containers) of intermediate-level waste, which it has produced since the 1960s, and is producing an additional 5 cubic metres annually.[11] This includes waste from the production of radiopharmaceuticals and mineral sands processing and used sources from medical, research and industrial equipment. Most of it's stored in secure facilities at the Lucas Heights site. Much smaller volumes are held by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) facility at Yallambie in Victoria. Australia has also accumulated about 10,000 drums of radioactive soil and each year produces the equivalent of less than a shipping container full of low-level waste from research, medical and industrial activities.

Sabotage of these facilities wouldn't have catastrophic consequences of the type expected from a successful IND detonation or an attack on a nuclear power plant, but it could have health effects for staff at the facilities as well as for first responders, and could have a significant economic impact.

Australia is currently trying to reduce the risks associated with its domestically generated radioactive waste through a national initiative to establish low- and intermediate-level waste stores. This process, however, has been beset with difficulties. The plan is for radioactive waste to be transported out of Lucas Heights, where it poses a potential threat to the local population, to a new national hazardous waste repository in the Australian outback, where it will be less vulnerable to theft and sabotage, and where the population density is extremely low. The previous government committed $35.7 million to develop this site,

which, if approved, would become Australia's first long-term repository for radioactive material, including for parts of Australia's retired 1960s nuclear reactor, which was taken out of service in 2007.

The preferred site (and reportedly the only location under consideration) is at Muckaty, 800 kilometres south of Darwin. But there's been controversy and negative press coverage about claims that the facility is being imposed on the Aboriginal community that lives in surrounding areas, and the consultation process might take much longer than expected. In the meantime, waste will continue to be stored at Lucas Heights, where an interim dry-storage warehouse facility is under construction. The transport container has reportedly been designed to withstand a drop of 9 metres, temperatures above 800 degrees Celsius, and an earthquake or plane crash.[12] Suffice to say that the potential for accident or domestic sabotage is taken seriously by Australia's nuclear industry and regulators, despite the relatively low level of risk.

Terrorist actors and intent in Australia

Any assessment of the risks of nuclear and radiological terrorism in Australia requires a discussion on terrorist actors and intent, in addition to the physical vulnerabilities posed by the existence of materials and facilities. Today, terrorist threats no longer capture the media headlines in Australia to the extent that they did in the aftermath of the 2002 Bali bombing, and they declined as a security priority under the 2007–2013 Labor governments. Australia's National Security Strategy, which was launched by then Prime Minister Julia Gillard on 23 January 2013, lists espionage and foreign interference as the top national security risk facing Australia.[13] Malicious cyber activity also makes it into the top three risks, whereas terrorism and violent extremism appear at the bottom of the list. This contrasts with the US Nuclear Posture Review Report, the US National Security Strategy and the UK National Security Strategy, which all list terrorism as the number one national security threat.

Yet, despite the relative decline of concerns about terrorism among Australia's political leaders, it continues to be a major preoccupation of the Australian Security Intelligence Organisation (ASIO), which has recently stated that terrorism poses 'the most immediate threat to the security of Australians and Australian interests', and has described it as 'real and persistent.' In ASIO's 2011–12 report to parliament, the dissemination of violent jihadist ideology is identified as the most serious challenge, both from external sources and from home-grown radical terrorist networks.[14] In Australia as elsewhere, this is facilitated by social networks and the internet and intensified by the willingness of radicalised individuals to travel to jihadist training camps overseas, and then return to Australia where they use their knowledge and experiences to expand their networks and plan attacks.[15] Favoured destinations overseas are Lebanon, Yemen, Somalia, Afghanistan, Syria and Pakistan. It's been reported that terrorists have also trained in remote areas of Australia, and even in the Blue Mountains near Sydney.[16]

Relative to other Western countries, the jihadist threat in Australia is relatively low. However, its existence, combined with that of other violent extremist groups and individuals, the proximity of Jemaah Islamiyah and non-al-Qaeda-affiliated terrorist organisations in Southeast Asia, the increasing incidence of irregular maritime arrivals on Australia's northern shores, and the involvement of Australian citizens in jihadist training camps and violent campaigns in Africa and the Middle East, makes it an important concern for those tasked with overseeing the country's national security.

Over the past decade, a number of home-grown jihadist terrorist plots have been foiled during the planning stages, including planned major attacks on Australian cities by members of Melbourne- and Sydney-based jihadist groups.[17] Significantly, as outlined above, one such group is known to have scoped out the nuclear reactor at Lucas Heights. Moreover, Australia has also been identified as a target by al-Qaeda and affiliated groups on many occasions. Most recently, in an as-Sahab video posted on jihadist forums on 11 September 2012, an unknown narrator stated that '[whoever submits] to the religion of truth, Islam, whether from America, Australia, Germany, or any other country, is considered a brother by the fighters.'[18]

It isn't publicly known whether these groups, other violent extremist groups, or malicious individuals have considered conducting IND or RDD attacks on Australian soil or on Australian interests overseas. So far, the plans uncovered and publicised in Australia have all involved conventional explosives, firearms and/or the mass stockpiling of chemical

agents, which are much cheaper and easier to acquire and handle than nuclear and radiological materials.

This shouldn't be a reason for complacency. While nuclear or radiological terrorism threats might appear far-fetched compared to conventional ones, the potential consequences of a successful attack could be extreme, and the obstacles aren't as difficult for non-state actors to overcome as is generally assumed. For example, in 1977, an American undergraduate student designed a 10-kiloton nuclear weapon the size of a beach ball in less than a year.[19] If determined and well-educated individuals managed to acquire sufficient HEU, they could assemble and detonate a similarly crude IND (see Appendix 1 for further details). After 9/11, this possibility has been thrown into sharp relief, leading to numerous efforts and initiatives to strengthen nuclear security throughout the world.

Nuclear and radiological terrorism scenarios in Australia

To help visualise what's otherwise an abstract discussion, consider the following scenarios.[20] Imagine that a group inspired by al-Qaeda purchases HEU from a Chinese criminal network, which has stolen the material from poorly secured research reactors in mainland China, where a few such reactors still use weapons-grade HEU. The terrorist group, which has been operating from the southern Chinese city of Shenzhen, has spent the past 18 months exploiting the gaps in Chinese export controls to procure all of the elements needed to construct an IND, much of it originating in or transhipped through the local port. The group has also been using its international network to access the expertise of weapon experts to help it design and construct an IND. The weapon has an explosive yield of approximately 10 kilotons, the equivalent to 10,000 tons of TNT. These activities have passed under the radar of customs officials and international intelligence agencies: they haven't focused their counterterrorism efforts on Shenzhen, which has a small indigenous Muslim community and an intermittent stream of foreign tourists visiting its mosque.

The group conceals the IND in a shipping container bound for Port Botany, Australia's second busiest commercial port, which is located in Botany Bay, close to Sydney Airport and relatively close to the Sydney CBD. Three members of the group, all of whom want to die martyrs, travel on the ship as cargo passengers, passing themselves off as tourists. Two of them were born in Sydney, where they became members of a home-grown terrorist network before travelling to Islamabad to do advanced engineering training. As cargo passengers on the Sydney-bound ship, they enjoy privileged access to the crew's facilities and share dinners at the captain's table, which is one of the selling points of this unusual mode of public transport. They quickly gain the trust and friendship of the crew, which knows nothing of their plans and doesn't suspect that anything is amiss.

The terrorists detonate the IND just as their container is being unloaded from the ship at Port Botany. The explosion instantly vaporises them, the crew and the container ship. It also obliterates much of the port, destroying the bulk liquid berths that are used for importing natural gas, oil, petroleum and chemicals. It also damages much of Sydney Airport and Botany Bay, instantly killing thousands due to the explosive impact or burns, and reduces much of Australia's vital transport infrastructure to fire and rubble. Of the survivors, those who spend more than an hour outside receive radiation doses that will be fatal within three weeks, leading to the deaths of hundreds—and possibly thousands—more people.

In a ring from 6 to 10 kilometres around the blast (an area that includes densely populated areas as far north as the Sydney suburb of Alexandria), buildings and people can survive the attack, but the area is contaminated and uninhabitable and the residents receive serious radiation poisoning. Even if the victims receive medical treatment to support their immune systems, many can become seriously ill within three weeks. Depending on the wind direction, the radioactive contamination could also make land uninhabitable and have health effects for those outdoors further afield.

In total, many thousands of people could be killed or seriously injured, the cost to property and infrastructure could be in the billions, and it could take years and a massive decontamination program to make Port Botany, Botany Bay, Sydney Airport and the surrounding industrial and residential areas habitable again.

Similar scenarios have been fully played through and 'price tags' have been estimated. For example, a 2003 study concluded that an IND detonation of 10–20 kilotons in a major

US seaport, such as that of New York City, 'would create disruption of US trade valued at US$100–200 billion, property damage of US$50–500 billion and 50,000 to 1,000,000 lives would be lost'.[21] In 2006, another study estimated that an IND detonation of 10 kilotons at the port of Long Beach in California would kill 60,000 people instantly, expose 150,000 people to hazardous levels of radioactive water and sediment from the port, destroy the entire infrastructure and all ships in Long Beach and the adjoining port of Los Angeles, force the evacuation of 6 million people from the Los Angeles area, require 2–3 million people to be relocated because of radioactive fallout, and exceed US$1 trillion in 'early costs'—putting the estimated US$50–100 billion cost of 9/11 into sharp perspective.[22] Of course, non-measurable but no less important is the psychological impact that an IND attack would probably have on the local population, national authorities and the international community as a whole: it could be so profound as to change national and international priorities, and have deep and lasting consequences for global governance.

Off-the-record discussions with Australian nuclear security experts suggest that the method of delivery described in the Port Botany scenario would be beset with difficulties for terrorists and unappealing to them because they'd probably prefer to maximise the impact of their IND by detonating it in Sydney's commercial centre or harbour. Some US experts would disagree with at least the first part of that assessment, however.[23] After 9/11, container shipping was identified as one of the mostly likely sources for an IND attack, leading the US to set up the Container Security Initiative, which aims to increase security for maritime containerised cargo shipped to the US from around the world, and the Megaports Initiative, which works with various foreign authorities to enhance detection capabilities for special nuclear and other radioactive materials in containerised cargo transiting the global maritime shipping network.

Of course, this scenario is at the extreme end of the scale, and (as summarised in Appendix 1) the challenges in developing and successfully detonating an IND are still important, keeping the odds of such a scenario becoming reality relatively low, but it's not impossible. And, worryingly, there's a more dramatic and catastrophic version of the scenario, in which the terrorist group gets hold of a military nuclear weapon. After all, there are notorious concerns about the security of Pakistan's nuclear arsenal, which consists of as many as 100–120 nuclear weapons.[24] If terrorists managed to acquire a Pakistani nuclear weapon, transport it to Port Botany (or Sydney Harbour) and detonate it, the consequences would be more dramatic because such a weapon would have a more powerful yield than an IND.

Today, however, the principal threat is an RDD attack. It would be a much more plausible scenario simply because the barriers to conducting such an attack are considerably lower than for an IND attack (and because states, even presumably Pakistan, remain in control of their arsenals). An RDD attack would have a much less severe impact in terms of loss of life and injuries, but the economic damage and psychological impact shouldn't be underestimated, especially if the device were detonated in Sydney's CBD. In addition to the potential deaths and injuries stemming from an explosive blast, an RDD would be likely to cause serious injuries beyond the victims in close proximity to the blast and those who try to assist them, particularly first responders, who might not wear the required equipment and take the necessary precautions.

Economic costs would include the evacuation, the shutdown of business operations, medical services, and the clean-up. Significantly, the psychological impact would be high, creating confusion, possibly even chaos, among the population of the affected areas and probably beyond. Sydney would be remembered as 'that city where the line was crossed', prompting questions like 'What could terrorists do next?' and giving much more credence to the IND threat, which too many people continue to dismiss as fantasy today. In short, even a 'dirty bomb' has the potential to inflict serious damage on a city like Sydney, disrupting its normal operations for several weeks, if not months.

Just as Australia could be the direct victim of an IND or RDD attack as outlined in these scenarios, it would be indirectly affected if such an attack were to occur in Jakarta, Kuala Lumpur, Singapore or even in a city farther away because, in a globalised world, an attack anywhere can have consequences everywhere. For Australia, this would be particularly true if the attack took place in Southeast Asia or in the South Pacific, for obvious geographical reasons. This means that it's in Australia's national security interests not only to uphold the highest levels of nuclear and radiological security at the domestic level, but also to ensure that other countries (particularly the countries in its near neighbourhood) do so as well and, if they lack capacity, to provide them with the assistance they need.

Australia and nuclear terrorism prevention

Ensuring that nuclear terrorism remains a low-probability threat in Australia and its near neighbourhood (and further afield) is dependent on many factors, at least two of which Australia can directly control. One, as mentioned, is the maintenance of exceptionally high standards of security at Australian nuclear facilities and wherever nuclear and radiological materials are used, stored or transported. The other is the provision of carefully targeted and effective nuclear and radiological security capacity building to countries that can benefit most from Australia's assistance.

In both respects, Australia has strong foundations on which to build. Experts around the world acknowledge that Australia's stringent domestic standards and international leadership in this area have played a vital role in building the global nuclear security framework that's helping to reduce vulnerabilities. An examination of Australia's proactive role helps clarify how and why Australia has earned this reputation, despite its limited nuclear infrastructure and equally limited diplomatic resources.

The quickest way to gauge Australia's role is to read the 2014 Nuclear Threat Initiative (NTI) Nuclear Materials Security Index, which assesses the contribution of 176 states towards improved global nuclear materials security.[25] The study, which was conducted with the assistance of the Economist Intelligence Unit and an international panel of experts and other technical advisers, scores state contributions to nuclear security across five categories of publicly available data: quantities and sites; security and control measures; global norms; domestic commitments and capacity; and risk environment. The results are striking: Australia ranks first overall among states with weapons-usable nuclear materials on their territory, excelling in all five categories. Specifically, Australia ranks equal first on quantities and sites, having reduced the quantity of HEU on its territory to less than 5 kilograms, all of which is secured at Lucas Heights. Australia also ranks equal first on global norms and on domestic commitments and capacity, equal fifth on risk environment, and eighth on security and control measures.

Table 1: Nuclear Threat Initiative (NTI) Nuclear Materials Security Index—Summary results: Countries with weapons-usable nuclear materials. Overall score.

Rank / 25		Score / 100	▲
1	Australia	92	+2
2	Canada	88	+6
3	Switzerland	87	–
4	Germany	85	+3
5	Norway	83	+1
6	Poland	82	+1
=7	France	81	+2
=7	Netherlands	81	–
9	Belarus	80	+5
10	Belgium	79	+7
=11	United Kingdom	77	-1
=11	United States	77	-1
=13	Argentina	76	+4
=13	Japan	76	+6
15	Kazakhstan	73	–
16	South Africa	71	-1
17	Italy	70	-1
=18	Russia	66	–
=18	Uzbekistan	66	+5
20	China	64	+1
21	Israel	57	+2
22	Pakistan	46	+3
23	India	41	+1
24	Iran	39	–
25	North Korea	30	–

Overall scores and ranks for 2014 are shown. All countries are scored 0-100 where 100 = most favorable nuclear materials security conditions.

= denotes a tie among countries.

▲ denotes change in score between 2012 and 2014.

– denotes no change between 2012 and 2014.

Source: NTI Nuclear Materials Security Index, *Building a Framework for Assurance, Accountability and Action*, 2nd ed., 2014 p.20. The report together with other useful information is available at http://ntiindex.org/.

Domestic activities

Appendix 2 helps elucidate why Australia ranks so highly on the NTI Index and why, two years after the first edition of the report was published, the updated NTI study places Australia in the same leadership position. Australia's nuclear and radiological regulatory authorities—the Australian Safeguards and Non-Proliferation Office (ASNO) and ARPANSA—have harnessed Australian expertise and established a culture of nuclear security excellence, overseeing the implementation of IAEA recommendations, encouraging the sharing of best practice, leading and participating in international nuclear security initiatives and ensuring that Australia upholds its international obligations, and they've done all of this despite limited resources.

Australian officials understand that these activities are part of an ongoing process that requires regular assessment and review, including external peer reviews of domestic controls. Reflecting this awareness, over the past year, Australia has reviewed and updated its 'design basis threat' (DBT), an internal assessment of the security threats facing the research reactor at Lucas Heights, using worst-case threat assessment methods developed by IAEA experts. Australia conducted similar DBT assessments in 1990 (focusing on a hostage scenario) and 2002 (inspired by the 9/11 events). The 2012 review was conducted using a more rigorous and detailed process, partly based on updated IAEA guidance documents, and for the first time included consideration of cyber vulnerabilities.[26]

While conducting the seven-month DBT review, Australia was busy preparing for the first peer review of its physical protection measures by a team of IAEA experts. Bilateral peer reviews of Australian facilities have been conducted by the US in 1991, 1997, 2001, 2005 and November 2013, but the November exercise was the first time a team of IAEA experts had conducted an International Physical Protection Advisory Service (IPPAS) mission in Australia.[27] The mission had involved a comprehensive review of the measures Australia is taking to control nuclear and other radioactive materials and prevent them falling into the wrong hands. Preparing for an IPPAS mission is a significant undertaking for any state, particularly for Australia, which hopes to receive a 'good practice' stamp of approval and to be used as a model in the international drive for nuclear security excellence.

International engagement

Beyond its domestic activities, Australia engages extensively at the international level. Few states can boast a comparable record of international leadership on nuclear security and, for that matter, on nonproliferation. Although this is partly motivated by Australia's desire to behave and be seen as a responsible international citizen, it's also self-interested. The Port Botany IND scenario highlights the transnational nature of nuclear and radiological threats: weak links anywhere in the world could have direct or indirect consequences for Australia or any other state. In that scenario, the IND originates from poorly secured Chinese research reactors and arrives in Australia direct from Shenzhen, but it could originate from elsewhere and make its way south along known smuggling routes into Myanmar, and from there travel by leisure craft via Malaysia or Indonesia to a remote bay in Australia. Once it reaches Australia, it could be transported by road to an Australian city and detonated.

In these circumstances, even the most stringent and effective nuclear security measures at Australia's nuclear facilities can't protect the country from certain types of attack. Therefore, cooperating with other states to address mutual vulnerabilities and close loopholes should be—and has been—a national priority.

International nuclear security cooperation takes different forms, and Australia has a strong record across the board. First, at the elite political level, it involves raising awareness of nuclear and radiological threats and the need to address them. This is primarily a diplomatic initiative involving talks with other countries' senior officials and political leaders. It plays a critical role in norm building and norm diffusion, goal and benchmark setting and confidence building. The US and the European Union lead the way through conferences under UN auspices and the US-led Nuclear Security Summit process. But Australia plays its part, putting its diplomatic weight behind US, European Union and other initiatives, serving as a role model, encouraging states to ratify and implement the relevant nuclear security conventions, and trying to develop proposals acceptable to developing states as well as developed ones (more on this below). It helps, of course, that ASNO is part of the Department of Foreign Affairs and Trade (DFAT), which has a deep understanding of the value of multilateral diplomacy, particularly its role in generating political will among states to tackle difficult transnational challenges.

While its high-level diplomatic efforts are important, Australia's most significant contribution has been in fostering practical international counterterrorism cooperation, especially in nuclear terrorism prevention. In addition to serving on the Operational Experts Group of the Proliferation Security Initiative (a collaborative effort to interdict cargoes suspected of containing WMD or related materials), Australia is a founding member of the Global Initiative to Combat Nuclear Terrorism (GICNT), which is instrumental in building collaboration to prevent attacks. Australian officials currently chair the GICNT nuclear forensics working group and participate in the GICNT nuclear detection working group. GICNT runs workshops and exercises that foster intergovernmental linkages, build technical capacity and encourage information sharing. In May 2012, as part of this work, Australia hosted a seminar and tabletop exercise in Sydney called 'Iron Koala,' in which international participants addressed the problem of unregulated radioactive material and the complexities of nuclear smuggling.[28]

Australia plays a similarly practical role in the US-led Global Partnership and within the IAEA, where its officials serve on four key Vienna-based expert guidance groups:

- the Director General's Advisory Group on Nuclear Security, which meets twice a year to provide the IAEA Secretary General with advice on nuclear security matters (members are appointed as individuals rather than as state representatives)
- the Nuclear Security Guidance Committee, which reviews and updates the agency's series of guidance documents
- the Experts Group on Information Exchange, which promotes the IAEA Code of Conduct on the Safety and Security of Radioactive Sources (Australia currently chairs this group)
- the Emergency Preparedness and Response Expert Group, which provides guidance on how to prepare for and respond to an event involving radioactive materials.

Significantly, Australia's international nuclear security efforts pre-date 9/11. In the 1990s, for instance, Canberra provided considerable assistance to a number of former Soviet republics, establishing its international reputation of one of the countries that 'get' the risk of nuclear terrorism and are able and willing to provide important expertise and resources in this domain. After 9/11, and especially since the arrest at Lucas Heights, Australia's reputation has only flourished further as Canberra has worked closely with the US and others to enhance nuclear security throughout the world.

Regional initiatives

In Australia's international engagement activities, its focus has been on fostering nuclear and radiological security cooperation in Southeast Asia and the South Pacific. For Australia, it makes sense for practical and strategic reasons to target its outreach activities on building capacity and collaboration in those regions. Transnational threats to Australia and the wider region are most likely to emanate from Southeast Asia and the South Pacific, or at least transit through them, and it's there that Australia has most to offer in technical assistance: there's a close fit between Australia's national security priorities, capabilities and experience and the needs of neighbouring states. The phrase 'Less Geneva, more Jakarta', which is currently so fashionable in Canberra's corridors of power, has shaped Australia's nuclear security engagement for many years, as its regulators have tried to allocate limited resources where they'll be of most direct benefit to Australia and where Australia can add most value to global efforts. Some of these activities have played a critical role in building the global nuclear security architecture.

The most important trailblazing Australian initiative was the Regional Security of Radiological Sources (RSRS) project, which was funded by the Australian Agency for International Development (AusAID) and led by the Australian Nuclear Science and Technology Organisation (ANSTO), in partnership with the US National Nuclear Security Administration and the IAEA Office of Nuclear Security.[29] This initiative was launched in 2004 as part of the Australian Government's commitment to a broad range of counterterrorism cooperation in Southeast Asia, with the goal of helping neighbouring countries to improve their protection and management of radioactive sources, many of which are found in poorly secured places, such as hospitals and various industries.

Most of the work revolved around a series of in-country practical training programs and workshops, which ANSTO and its international partners used to help transfer knowledge, skills and experience to operators and regulators in countries with the most urgent assistance needs:

Indonesia's Badan Tenaga Nuklir Nasional, the Philippines Nuclear Research Institute, Thailand's Office of Atoms for Peace and Institute of Nuclear Technology, and the Vietnam Agency for Radiation and Nuclear Safety. ANSTO also ran regional meetings to foster the development of a regional intergovernmental radiological security network: in Indonesia in July 2008, Vietnam in March 2010, and the Philippines in January 2012.

During the project's nine years of operation, it was widely recognised as the embodiment of the type of deep security collaboration necessary to build global resilience against transnational threats. It was needs-based, efficient and effective—a carefully targeted, bottom-up approach to security-building. Not surprisingly, the sudden withdrawal of AusAID funding and cancellation of the program in 2013 were greeted with dismay in Vienna, where many experts attending the IAEA Nuclear Security Conference learned for the first time of the project's untimely demise.[30]

Although the RSRS project was probably Australia's most significant regional radiological security contribution (at least in terms of long-term capacity-building), Canberra has led many smaller scale and one-off technical workshops, which have helped raise awareness, develop expertise, increase transparency and build trust and confidence. In 2012 alone, Australia hosted or ran several such initiatives nationally and across the region. One example was the Regional Forensics Workshop of March 2012, which brought together experts from ANSTO, the Australian Federal Police and the IAEA to share experiences of radiological crime scene investigation with representatives from the region. Feedback from the participants was later used to develop the IAEA's draft guidance on radiological crime scene management. A second example was the Regional Workshop on the IAEA International Physical Protection Advisory Service, which Australia co-hosted in November 2012. This used the opportunity of the November 2013 IPPAS mission to Australia to share ideas with regional participants on the methods and benefits of international peer review. The following month, ARPANSA hosted a regional training course on the security of nuclear material in transport, sharing Australia's experience of international best practice with operators and regulators from Southeast Asia. These initiatives provide a big bang for the buck: they cost little (individual workshops cost less than $100,000), and yet they help transfer important skills and knowledge and build intergovernmental networks that facilitate regional information-sharing.[31]

Learning from Australia's experiences

Australian officials have learned a lot from their experience in nuclear security diplomacy and outreach. Those lessons can help shape Australia's future nuclear security strategy and offer insights for states in other regions that could play a comparable leadership role. The significance of the lessons also extends well beyond the nuclear and radiological security realm to show how middle powers can harness their indigenous skills and experience to help build international resilience against myriad other transnational threats, ranging from drug smuggling to cybercrime and pandemics. Three key lessons stand out from Australia's experience: pace matters, size matters and people matter.

Pace matters

Building international consensus on how to prevent nuclear terrorism may be frustrating and time-consuming, but it's vital. Any weak links in the nuclear security chain can undo even the most determined efforts. Yet different states have different priorities, capabilities and approaches to security, and the global regime-building process needs to occur at a pace and through a process acceptable to the majority. This lesson isn't new: many states that recognise the urgency of different traditional and non-traditional security threats have had to swallow this bitter pill in the various bodies that comprise the UN system. Over the years, Australia has taken more than its fair share of such pills in the IAEA, where it's found the slow take-up of strengthened nonproliferation safeguards at times exasperating.

But Australia's experience of the Nuclear Security Summit process has shown that, even outside of the UN system, building international consensus is a laborious process that can't be rushed. Plainly, although nuclear security can be taken out of the UN, the UN can't be taken out of nuclear security: many of the same dynamics in play in nonproliferation and disarmament diplomacy exist in the nuclear security domain, whether we like it or not. In Australia's case, its national enthusiasm for regulation and for building international legal frameworks led its officials to occasionally push too hard, too fast in summit negotiations.

In a series of preparatory meetings leading up to the 2010 Nuclear Security Summit in Washington DC (known as Sherpa and sous-Sherpa meetings, which involve diplomats and technical experts from the countries taking part in

the summit), Australia worked with the US to present a transparency proposal that encouraged states to share sensitive information and provide 'threat briefings' outlining their nuclear security risks, including information on export denials.[32] The proposal proved contentious, particularly among some members of the Non-Aligned Movement, which regarded it as a way of slipping controversial nonproliferation proposals through the 'back door' of nuclear security.[33] The proposal had to be dropped.

A second misstep occurred during the Sherpa meetings leading up to the 2012 Nuclear Security Summit in Seoul. Australia put its diplomatic weight behind a US proposal to establish a tracking mechanism to follow the progress made by states in implementing the work plan and communiqué set out at the 2010 Washington summit.[34] The idea behind the proposal was logical and sensible: it would be a way of promoting follow-through between one Nuclear Security Summit and the next, so that the implementation of concrete nuclear security measures followed verbal commitments. Australia was the first country to provide a comprehensive report on the steps it had taken to address each individual commitment in the communiqué and work plan, and encouraged other states to follow its lead. However, the 'report card' concept proved unpopular: only the US and Jordan followed Australia's example. Some of this resistance can be explained by the gap that exists between approaches to international security-building that emphasise transparency and compliance, and those that encourage a more informal, trust-based approach. As a result of these differences, the spirit of consensus began to dissolve, creating different factions that followed different agendas during Sherpa meetings. Not surprisingly, Australia's second major initiative was also dropped.[35]

Australian diplomats have adapted their strategy as a result of these disappointing outcomes. The current Australian approach is slower paced, revolving around the concept of international assurances. This concept is defined as 'activities taken, information shared, or measures implemented voluntarily by a state or other stakeholders that provide confidence to others of the effectiveness of nuclear security within a given state'.[36] The important point is that this approach moves away from what's seen by some developing states as overintrusive monitoring and verification and the 'one size fits all' measures involved in formal regime building. Instead, it focuses on building confidence and trust through an informal and voluntary process of information sharing. This means that states would voluntarily publish reports on their nuclear security measures; invite external peer reviews of their nuclear security systems; launch best practice exchanges; and engage in other collaborate initiatives at their own pace and in a way that squarely respects the principles of equity, fairness and sovereign responsibility.

Size matters

Probably the most important lesson that Australian experts and officials have learned in their nuclear and radiological security efforts is that size matters. Although broad-based multilateral efforts are essential and must be pursued at the elite political level, more rapid progress can be achieved through parallel initiatives at the bilateral and regional levels. In particular, targeted regional projects that focus on transferring a single skill, such as the ability of customs officials to detect radioactive substances, are low-cost, high-impact initiatives. In this sense, the more focused the initiative, the better. Yet, although one-off workshops have their benefits, they're generally more effective over the longer term if they occur under the auspices of an institutional framework that can sustain regional interagency cooperation and promote follow-up exercises. This was the major achievement of the RSRS project, which created an ongoing regional peer review process on radiological sources security in Southeast Asia. The project was abandoned prematurely: it was the most advanced initiative of its kind that had ever existed in the radiological security domain.

The lessons Australia has drawn from its nuclear security diplomacy activities over the past decade suggest that the time is ripe to fill this gap. What's needed is a formal regional nuclear security mechanism to run parallel to and draw upon IAEA and Nuclear Security Summit activities, and serve as a model for regional nuclear security cooperation around the world. Australia's experience in leading this kind of regional collaborative exercise makes it the ideal candidate to launch such an initiative. Following the establishment of the RSRS project in 2004, Australia founded the Asia–Pacific Safeguards Network (APSN) in 2009, with the goal of promoting cooperation between safeguards authorities in the region.[37] Although the focus of this network is nonproliferation, it now includes an informal working group on nuclear security at Australia's request.[38] This could provide the seed of a new dedicated regional body. The point

about issue-specificity is driven home here: Australian efforts to formalise the APSN's informal working group on nuclear security have met resistance from officials who would prefer not to water down the network's core safeguards function. The need to spearhead a new and separate regional nuclear security mechanism is clear (more on this below).

People matter

The Australian experience also suggests that the role of individual champions who can leverage their influence within and across international borders is critical to address transnational threats. This is especially true in the case of nuclear and radiological security, where the nature of the threat is often too abstract for politicians, who often prefer to focus on threats that appear more concrete, newsworthy and politically salient. Without nuclear security champions operating inside and outside government bureaucracies, momentum to create an effective global nuclear security framework can't gain traction.[39]

Australia's nuclear security leadership has been driven by a handful of individual champions. In addition to key people within the Australian bureaucracy in ASNO, ANSTO and ARPANSA (including Robert Floyd, David Hill, Stephan Bayer and Alan Murray, who recently impressed international audiences at the 2013 Nuclear Security Conference in Vienna), this group consists of Australians who are based overseas and who are helping to shine a light on nuclear dangers and ensure that they're given the attention they deserve:

- Emma Belcher, director of the International Peace and Security program at the Chicago-based John D and Catherine T MacArthur Foundation
- John Carlson, former Director General of ASNO and currently NTI Counsellor, who has probably been the most active and influential Australian nuclear security champion
- Peter Coglan, former head of detection and response in the IAEA Office of Nuclear Security
- Gareth Evans, former foreign minister and convenor of the Asia–Pacific Leadership Network on Nuclear Non-Proliferation and Disarmament
- Trevor Findlay, senior research fellow in Harvard University's Project on Managing the Atom and former director of the Nuclear Energy Futures Project at the Centre for International Governance Innovation in Waterloo, Canada
- Geoffrey Shaw, director of the IAEA office in New York and former assistant secretary of ASNO.

The important regime-building role that individual champions play can be seen from the work of those involved in the NTI-hosted Global Dialogue on Nuclear Security Priorities, who have been driving the proposal on international assurances.[40] Australian nuclear security champions John Carlson, Robert Floyd and Trevor Findlay have been active members of this non-government forum, helping to define the concept of assurances, pin down what it means in practice and shape the proposal that Australia and others are currently promoting. Crucially, Floyd (Director General of ASNO and Australian Sherpa) has helped carry the proposal from the non-government forum and into the official Sherpa process, where it formed the basis for discussions at the November 2012 Sherpa meeting in Istanbul and the April 2013 sous-Sherpa meeting in the Hague. It's yet to be seen whether language on international assurances will make its way into the communiqué to be discussed at the Nuclear Security Summit in the Hague in March 2014, but if it does that will be largely thanks to the efforts of a core group of nuclear security champions from Australia, the US and the Netherlands.

A proposal for the Abbott government

The recent election of Tony Abbott as prime minister offers Australia an opportunity to take stock of these experiences and develop a comprehensive nuclear security strategy to better address nuclear dangers. This strategy should be grounded in multilateral cooperation because, by definition, transnational threats such as nuclear terrorism lend themselves well to multilateral approaches. Of course, bilateral agreements *can* achieve much as well. The 2006 Australia–Indonesia Lombok Agreement, for instance, has provided a useful framework to address many security issues, ranging from defence, law enforcement, counterterrorism, intelligence, maritime security and aviation safety to WMD nonproliferation and bilateral nuclear cooperation for peaceful purposes. Such bilateral efforts should be pursued. On balance, however, Australia should give priority to multilateral approaches because they offer norm-building

opportunities and, at a time of fiscal constraints, provide important efficiency and savings benefits.

Also significant is that multilateralism is more politically acceptable than bilateralism, especially in Southeast Asia. As the Asialink Commission put it in a 2012 report:

> Bilateralism is the traditional strategy of major powers, and in Southeast Asia it is remembered as the 'hub and spokes' attitude long adopted by the US in the region. When Australia opts for bilateralism this tends to feed into the 'deputy sheriff' trope. Australia, ASEAN representatives advised, needs to differentiate itself from this type of 'divide and conquer' approach—to distance itself from the perceived arrogant Western behaviour of the past.[41]

Three initiatives

With these considerations in mind, the Australian Government's nuclear security strategy should focus on implementing the following action items:

- For starters, *the RSRS project should be relaunched*. This project was the most advanced of its kind and proved extremely successful in all respects, so much so that the US National Nuclear Security Administration and the IAEA saw it as a trailblazer. Its recent cancellation was a mistake. It should be reinstated immediately. Time is of the essence: the sooner it's revitalised, the better, because the network it's developed since 2004 won't have broken up.
- A *new regional initiative centred on nuclear security* should be created. The goal of this initiative should be to develop a stand-alone regional assurance mechanism for nuclear security in the Asia–Pacific. It should be a multistakeholder effort conducted in close collaboration with the IAEA, domestic nuclear agencies across the region and, of course, the nuclear security centres of excellence in Japan, South Korea and China. Relevant Australian universities and foreign policy think tanks should also be involved, as should regional non-government networks such as the Council for Security Cooperation in the Asia Pacific (CSCAP), especially the CSCAP Nuclear Energy Experts Group. This initiative should work to promote adherence to and implementation of the Convention on the Physical Protection of Nuclear Material as amended, the International Convention for the Suppression of Acts of Nuclear Terrorism (commonly known as the 'Nuclear Terrorism Convention'), and the IAEA's Information Circular 225 on the Physical Protection of Nuclear Material and Nuclear Facilities. It should also encourage transparency and assurances on nuclear security practices. Given Australia's traditional focus and expertise, the initiative should centre its efforts on Southeast Asia, particularly Vietnam, which is developing a relatively ambitious nuclear power program, and Indonesia, Malaysia and Thailand, which also have nuclear energy ambitions.
- As part of the initiative, participants could discuss a proposal to amend the Southeast Asia Nuclear-Weapon-Free Zone Treaty (also known as the Bangkok Treaty) to include physical protection in its provisions. Unlike the African Nuclear-Weapon-Free Zone Treaty (or Pelindaba Treaty), the Bangkok Treaty covers nuclear safety but is silent about nuclear security. Discussions on this issue have cropped up in CSCAP meetings over the past decade, but the idea needs to be explored in greater detail, and more diplomatic weight needs to be put behind it.
- Finally, the Australian Government should start a *public education campaign* to raise awareness of nuclear and radiological security challenges and opportunities, both in Australia and at the international level, making full use of its key domestic agencies (ASNO, ANSTO and ARPANSA) as well as the IAEA and the Nuclear Security Summit process.

Rationale

Why should the new Australian Government invest in implementing this proposal, especially given that Australia's 2013 National Security Strategy did not place counterterrorism high on the list of security priorities? Other threats, such as espionage and malicious cyber activity, now feature more prominently, and there's been a shift in emphasis (in Australia and elsewhere) away from the post-9/11 focus on transnational threats and back to a traditional preoccupation with competitive state-to-state relations. In the Asia–Pacific, this shift has found expression in the context of China's re-rise and the US 'rebalance' to the

region, and in the many questions being asked about the evolution of the regional order and the implications for US allies and others. Granted, these dynamics pose important, legitimate questions for Australia, but they shouldn't divert attention from equally serious transnational challenges.

The reverse, of course, is also true. In the words of Rod Lyon, who in a recent article discusses US extended deterrence and assurance in the Asia–Pacific, 'enhanced nuclear security is not a substitute for a robust strategic policy.'[42] The point here is that these issues are not, and shouldn't be seen as, mutually exclusive. On the contrary, they're mutually reinforcing. Although it mightn't naturally appeal to traditional strategic thinkers, in today's interconnected world, effective transnational security cooperation can help build international networks and relationships that can help reduce the competitive nature of state-to-state dynamics.

Spearheading the development of a regional assurance mechanism in Southeast Asia would serve the triple purpose of helping to reduce nuclear security dangers, achieve Australia's broader strategic objectives and fulfil its international obligations—and all at a very modest cost.

Six points about a regional assurance mechanism in Southeast Asia stand out:

- It would reduce the chances that nuclear and radiological materials will be smuggled through or from Southeast Asia and into Australia. This is critical, given that nuclear infrastructure already exists across Southeast Asia and is set to expand, increasing nuclear dangers.
- It would help enhance Canberra's security partnerships in the region, including by cementing closer ties with key countries, such as Indonesia and Vietnam, that need assistance to develop a strong nuclear security culture. It would also provide an opportunity for Australia to collaborate more closely with Japan and South Korea, which are also active in the nuclear security sphere. The nuclear security centres of excellence (already operational in Japan and due to be launched in South Korea this year) would provide useful vehicles for this cooperation, providing additional sources of expertise.
- It would help Australia meet its international obligations to provide assistance to states in need, as required by UN Security Council Resolution 1540 and encouraged in a number of IAEA resolutions and statements. Resolution 1540 makes it mandatory for all states to impose strict domestic controls on WMD and related materials, and calls on states that have the relevant knowledge and experience to help states that do not. The importance of these outreach activities, especially at the regional level, was stressed in the July 2013 Ministerial Declaration of the International Conference on Nuclear Security and was included in the Resolution on Nuclear Security adopted by the IAEA General Conference on 20 September 2013. As the NTI Index demonstrates, Australia has unique experience and expertise to add value in this area.
- It would further strengthen the Australia–US alliance, including its role in engaging third parties in the region—a direction heavily promoted by Washington at a time when the US is determined to 'rebalance' toward the Asia–Pacific but has fewer resources to invest than in the past. In other words, it would help further entrench the alliance as the 'southern anchor' of the US network of alliances in the region. After all, as stated in the statements following the recent Australia–US Ministerial Consultations, 'The United States and Australia have a vital stake in, and share a common commitment to, security and prosperity of the Asia Pacific region and are working together closely as the United States rebalances to the region.'[43]
- It would provide a big bang for the buck. Over the years, Australia's been investing in nuclear security excellence and it makes economic as well as strategic sense to continue to do so. The proposal outlined in this paper would require a relatively small additional investment for a very significant outcome. The cost of the cancelled RSRS project was mere petty cash in Australia's defence and security spending: ANSTO spent $567,000 in 2010–11 and $228,000 in 2011–12.[44] Relaunching that program is a no-brainer. The cost of the larger regional nuclear security mechanism would be higher, but still very modest (about $1.3 million per year, based on calculations by ASPI), and lower if South Korea and Japan could be encouraged to contribute.
- It would help Australia maintain its permanent seat on the IAEA Board of Governors, which is likely to come under pressure as states in the Southeast Asian region develop nuclear energy. Of the 35 seats on the board, 13 are permanent (or 'designated' under the IAEA

Statute) and 22 are elected on a non-permanent basis for two-year terms, which can't be consecutive. Australia holds the only permanent seat in the Southeast Asia and Pacific region—an influential position that dates back to the founding of the IAEA in 1957.[45] As stated on the DFAT website, this seat has always provided Australia with 'an optimal platform from which to pursue its non-proliferation policy interests'. Without it, Australia's global influence would be diminished, its nuclear expertise and industry would be disadvantaged, and DFAT would have to plough scarce resources into scrambling for periodic re-election.

- Finally, this low-cost, high-impact effort could stand as a role model for other regions, further boosting Australia's reputation at the international level. This could set a valuable example for other countries on the importance of serving the public good through multistakeholder regional cooperation. It could also provide a basis for mutually beneficial regional cooperation among other middle powers that possess comparable or greater nuclear expertise. Examples include South Korea, which is looking for ways to enhance its middle power credentials, and Canada, which is seeking to play a more significant and constructive role in Southeast Asia.

Appendix 1: Improvised nuclear devices, radiological dispersal devices and nuclear terrorism

Improvised nuclear devices

The development of an IND requires much time and considerable financial and technical assets. Short of stealing weapon-grade fissile material (HEU or plutonium), large financial resources—possibly millions of dollars—would be required to buy it. The mating of the fissile material with the rest of the weapon would be challenging and depend on the characteristics of the material and on the type of weapon design, demanding that terrorists have the necessary expertise (or are able to rely on experts). In most scenarios, clandestinely transporting the IND to its target, while not impossible, would also be logistically challenging, particularly in the case of an international operation.

The most difficult challenge is in obtaining the fissile material necessary to construct an IND, especially as nuclear security is slowly but surely improving throughout the world. It's not impossible, however, because control over fissile materials is far from perfect. Terrorists could also rely on direct assistance from a government to obtain fissile materials, they could receive assistance from a limited number of senior state officials or from fissile material production workers or custodians, or they could simply steal the material they need.

Based on the assumption that terrorists wouldn't have access to technologically sophisticated nuclear weapon design and fabrication infrastructure, it's assumed that they'd seek to build an IND based on first-generation technology—gun-type or implosion designs. While implosion-type weapons would pose significant design and construction challenges even to the most technically competent terrorist organisations (and could more easily produce a fizzle upon detonation), most physicists and nuclear weapons analysts believe that there are few technological barriers to the construction of gun-type weapons. The transportation of a completed IND, for its part, would require strong organisational skills and a dense network of collaborators. These difficulties, however, wouldn't be insurmountable.

For more information, see Charles Ferguson and William C Potter, *Improvised nuclear devices and nuclear terrorism*, Weapons of Mass Destruction Commission, Stockholm, 2006.

Radiological dispersal devices

By contrast, the development of an RDD would be much easier because it would only require terrorist organisations to obtain radioactive materials and have access to conventional explosives and other simple technologies.

Analysts have pointed out that there's a difference between making a 'crude' RDD and an 'effective' RDD. Terrorists would need to have expertise (or at least some knowledge) of radiation and radioactive materials, both to handle the materials properly in planning for and conducting their attack and to ensure that the radioactive material is dispersed effectively. However, even if the wrong material were obtained and only a low level of release were achieved, people would still panic.

For more information, see Jonathan Medalia, *'Dirty bombs': technical background, attack prevention and response, issues for Congress*, CRS Report for Congress, Washington, DC, 2011.

Appendix 2: Australia's nuclear security profile in 2013

(Updates available at www.dfat.gov.au/asno/nuclear-security-profile.html)

1. International legal framework		
Instrument	**Status**	**Date**
Convention on the Physical Protection of Nuclear Material	Ratified	22 September 1987
2005 amendment	Ratified	17 July 2008
International Convention for the Suppression of Acts of Nuclear Terrorism	Ratified	16 March 2012
UN Security Council Resolution 1540 (S/AC.44/2004/(02)/53	Report submitted	28 October 2004
UN Security Council Resolution 1540 (S/AC.44/2004/(02)/53/Add.1	Report submitted	9 November 2005
UN Security Council Resolution 1540 Committee Approved Matrix	Report approved	30 December 2010
2. Nuclear security related initiatives, partnerships and groups		
Initiative, partnerships or group	**Status**	**Year Joined**
Global Initiative to Combat Nuclear Terrorism	Founding member	2006
Proliferation Security Initiative	Participant	2003
Global Partnership	Participant	2004
3. Support and involvement with the IAEA		
Activity	**Status**	**Year(s)**
Advisory Group on Nuclear Security	Member	2013–present
Nuclear Security Guidance Committee	Member	2012–present
Emergency Preparedness and Response Expert Group	Member	2012–present
Incident and Trafficking Database	Member	1995–present
IPPAS missions	Host	November 2013
Code of Conduct on the Safety and Security of Radioactive Sources	Chair of Experts Group on Information Exchange	2007–present
Nuclear Security Fund	Contributor	2002, 2006, 2007, 2009
4. Domestic nuclear security		
Nuclear regulatory authority	**Website**	
Australian Safeguards and Non-proliferation Office (ASNO) (nuclear material and facility security)	www.dfat.gov.au/asno	
Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) (radioactive sources and emergency response for Commonwealth)	www.arpansa.gov.au	
Key Australian domestic legislation	**Date**	
Nuclear Non-Proliferation (Safeguards) Act	1987	
Australian Radiation Protection and Nuclear Safety Agency Act	1998	
Weapons of Mass Destruction Act	1995	
Customs Act	1901	
Customs (Prohibited Imports) Regulations	1956	
Customs (Prohibited Exports) Regulations	1958	
Implementation	**Details**	
IAEA recommendations	INFCIRC/225/Rev.5 (NSS-13) is a licence requirement for all nuclear facilities	
Design basis threat	Years of revisions: 1990, 2002, 2012	

5. Radioactive sources	
Item	**Status**
Support for Code of Conduct on the Safety and Security of Radioactive Sources	Australian support confirmed through GC(47) RES/7.b
Supplementary Guidance on the Import and Export of Radioactive Sources	Australian support confirmed through GC(47) RES/7.b
Dose Register	National sealed sources register: Category 1 and 2 sources

6. Peer review	
Type	**Years**
IPPAS	November 2013
US bilateral security visits	1991, 1997, 2001, 2005, 2013
IRRS and follow-up	2007, 2011

7. Nuclear forensics and detection		
Type	**Status**	**Years**
GICNT Nuclear Forensics Working Group	Chair	2010–present
GICNT Nuclear Detection Working Group	Participant	2010–present
IAEA Incident and Trafficking Database Points of Contact Group	Participant	2009, 2012
IAEA Subregional Nuclear Security Information Exchange and Coordination Meeting	Participant	2007, 2010, 2013
Nuclear Forensics International Technical Working Group	Participant	2003–present

8. Outreach and capacity building	
Activity	**Date**
Benchmarking Uranium Security	June 2013
IAEA Regional Workshop on Transport of Nuclear Material	December 2012
Regional Workshop on IPPAS Missions	November 2012
GICNT 'Iron Koala' Workshop on countering nuclear smuggling	May 2012
Informal Working Group on Nuclear Security (Asia–Pacific Safeguards Network)	2009-present

GC = IAEA General Conference; INFCIRC = IAEA information circular

Notes

1. NN Taleb, *The black swan: the impact of the highly improbable*, Random House, New York, 2007.
2. 9/11 Commission, *Final report of the National Commission on Terrorist Attacks upon the United States* (authorised edition), WW Norton, New York, 2004, p. 245.
3. 'Case against the Sydney accused', *Sydney Morning Herald*, 15 November 2005.
4. CD Ferguson 2010.'Potential strategic consequences of the nuclear energy revival', Institut Français des Relations Internationales, Proliferation Paper series, 2010, 35(Summer):23.
5. BK Sovacool, *Contesting the future of nuclear power: a critical global assessment of nuclear energy*, World Scientific, 2011, 186–87.
6. I Khripunov, D Kim, 'Time to think safety–security', *The Korea Times*, 8 August 2011.
7. US National Nuclear Security Administration, 'Final US-origin HEU shipment from Australia completed', press release, 21 May 2009.
8. International Atomic Energy Agency (IAEA), *IAEA safeguards glossary*, International Nuclear Verification series, 2001, no. 3, p. 23.
9. F Fitzpatrick, *Preventing nuclear dangers in Southeast Asia and Australasia*, IISS Strategic Dossier, IISS, London, 2009, pp. 175–176.
10. 'Tony Abbott advocates using nuclear power to cut greenhouse gas emissions', *Herald Sun*, 26 February 2010.
11. Department of Resources, Energy and Tourism, *Amounts of radioactive waste in Australia*, 17 July 2012.
12. Australian Government 2013, *Managing Australia's nuclear waste: where it is going?*, May 2013.
13. Department of the Prime Minister and Cabinet, *Strong and secure: a strategy for Australia's national security*, 23 January 2013.
14. ASIO, *Report to parliament, 2011–12*, 2012, pp. 2–3
15. Monash University, 'Understanding terrorism in an Australian context: radicalisation, de-radicalisation and counter-radicalisation', press release, 8 August 2013.
16. S Neighbour, *In the shadow of swords: on the trail of terrorism from Afghanistan to Australia*, Harper Collins, Sydney, 2005.
17. Australian Government alert, 'Four major terror plots foiled in Australia since 9/11', 8 September 2011; L Wilson, C Stewart, 'Melbourne terror attack "could have claimed many lives"', *The Australian*, 4 August 2009; C Miranda, 'John Howard recalls similar terror threats to Australian sporting events', *News Limited Network*, 17 April 2013.
18. Australian Government, *Listing of terrorism organisations*, 12 July 2013.
19. G Allison, *Nuclear terrorism: the ultimate preventable catastrophe*, Owl Books, New York, 2005.
20. Adapted from the Nuclear Threat Initiative nuclear terrorism tutorial.
21. CC Abt, *The economic impact of nuclear terrorist attacks on freight transport systems in an age of seaport vulnerability*, Abt Associates Inc, Cambridge, Massachusetts, 2003.
22. C Meade, RC Molander, *Considering the effects of a catastrophic terrorist attack,* RAND Corporation, Santa Monica, California, 2006.
23. RC Bonner, speech before the Center for Strategic and International Studies, Washington DC, 26 August 2002; G Luft, A Korin A, 'Terrorism goes to sea', *Foreign Affairs*, November/December 204: 64; G Allison, *Nuclear terrorism: the ultimate preventable catastrophe*, Owl Books, New York, 2005.
24. Stockholm International Peace Research Institute, *SIPRI yearbook 2013*, Oxford University Press, Oxford, 2013, p. 317.
25. Nuclear Threat Initiative (NTI) Nuclear Materials Security Index. *Building a framework for assurance, accountability and action,* 2nd ed., NTI, Washington DC, 2014, http://ntiindex.org/wp-content/uploads/2014/01/2014-NTI-Index-Report.pdf
26. S Bayer, 'Revising Australia's design basis threat', presentation to the International Regulators Conference on Nuclear Security, Washington DC, December 2012.

27. K Mrabit, 'International Physical Protection Advisory Services (IPPAS)', Presentation to the International Regulators Conference on Nuclear Security, Washington DC, December 2012.

28. ANSTO, *Annual report, 2011–12*, 2012.

29. A Murray, 'Australia's South East Asia Regional Security of Radioactive Sources Project—achievements and lessons learned', presentation to the International Conference on Nuclear Security: Enhancing Global Efforts, Vienna, 3 July 2013.

30. T Ogilvie-White, 'Australia's dirty bomb in Vienna', *The Strategist*, 5 August 2013.

31. US Department of State, *Global Partnership Working Group annual report: consolidated report data*, 2012, p. 3 of annex.

32. M Bunn, 'Strengthening global approaches to nuclear security', presentation to the International Conference on Nuclear Security: Enhancing Global Efforts, Vienna, 1 July 2013.

33. Wikileaks, 'The Nuclear Security Summit Sherpa meeting in Vienna', *Wikileaks Cable*, 24 September 2009.

34. J Carlson, 'Transparency, accountability and assurance in nuclear security', *NTI Paper*, 21 March 2012.

35. Fissile Materials Working Group, 'Nuclear materials security: cooperation is key', *Bulletin of the Atomic Scientists*, 28 June 2011.

36. R Floyd, 'Next steps on international assurances', presentation at the Third Global Dialogue on Nuclear Security Priorities, Annecy, France, 28–30 May 2013.

37. J Carlson, 'Strengthening safeguards through regional cooperation: establishment of the Asia–Pacific Safeguards Network', paper presented to the annual meeting of the Institute for Nuclear Materials Management, Baltimore, 11–15 July 2010.

38. J Carlson, 'Improving nuclear security governance in the Asia–Pacific', APLN Centre for Nuclear Nonproliferation and Disarmament, Policy Brief no. 5, June 2013.

39. D Santoro, 'Championing nuclear security', *Proliferation Analysis*, 10 September 2012.

40. Global Dialogue on Nuclear Security Priorities, *Rapporteur's report on the Third Global Dialogue on Nuclear Security Priorities*, 19 June 2013.

41. A Milner, S Percival Wood, *Our place in the Asian century: Southeast Asia and the 'Third Way',* Asialink Commission, University of Melbourne, 2012, p. 31.

42. R Lyon, 'The challenges confronting US extended nuclear assurance in Asia,' *International Affairs*, 2013, 89(4):929.

43. Australia–US Ministerial Consultations (AUSMIN), *Joint communique*, 20 November 2013.

44. ANSTO, *Annual report, 2011–12*, 2012, p. 72.

45. Department of Foreign Affairs and Trade and Australian Safeguards and Nonproliferation Office, *Joint submission to the Joint Standing Committee on Treaties Inquiry into Nuclear Non-proliferation and Disarmament*, 3 February 2009.

Acronyms and abbreviations

ANSTO	Australian Nuclear Science and Technology Organisation
APLN	Asia–Pacific Leadership Network
APSN	Asia–Pacific Safeguards Network
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASEAN	Association of Southeast Asian Nations
ASIO	Australian Security Intelligence Organisation
ASNO	Australian Safeguards and Nonproliferation Office
AusAID	Australian Agency for International Development
CSCAP	Council on Security Cooperation in the Asia Pacific
DBT	design basis threat
DFAT	Department of Foreign Affairs and Trade
GICNT	Global Initiative to Combat Nuclear Terrorism
HEU	highly enriched uranium
IAEA	International Atomic Energy Agency

IND	improvised nuclear device
IPPAS	International Physical Protection Advisory Services
LEU	low enriched uranium
NTI	Nuclear Threat Initiative
RDD	radiological dispersal device
RSRS	Regional Security of Radioactive Sources project
WMD	weapon of mass destruction

About the authors

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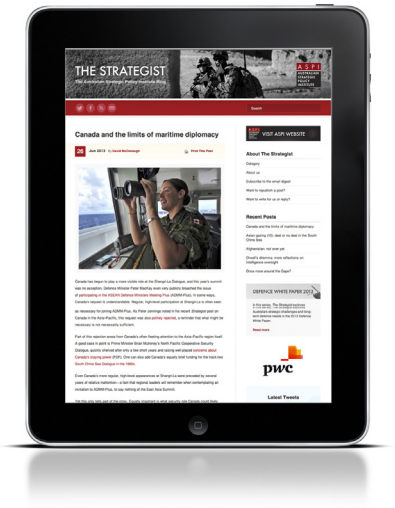

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