



## **Next Steps for Nuclear Security Governance in the Asia Pacific**

**A Conference Report of the  
CSCAP Nuclear Energy Experts Group Meeting**

**by  
Carl Baker and David Santoro**

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### **Pacific Forum CSIS**

Based in Honolulu, the Pacific Forum CSIS ([www.pacforum.org](http://www.pacforum.org)) operates as the autonomous Asia-Pacific arm of the Center for Strategic and International Studies in Washington, DC. The Forum's programs encompass current and emerging political, security, economic, business, and oceans policy issues through analysis and dialogue undertaken with the region's leaders in the academic, government, and corporate areas. Founded in 1975, it collaborates with a broad network of research institutes from around the Pacific Rim, drawing on Asian perspectives and disseminating project findings and recommendations to opinion leaders, governments, and members of the public throughout the region.

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The views expressed also represent personal impressions and reflections of participants; they do not necessarily represent the position of their respective governments, organizations, and institutes.

## **Key Findings and Recommendations**

### **Nuclear Energy Experts Group**

### **October 15-16, 2015, Singapore**

The Pacific Forum CSIS, in partnership with the S. Rajaratnam School of International Studies (RSIS) and with the support of the Carnegie Corporation of New York, held a Nuclear Energy Experts Group (NEEG) meeting in Singapore, Singapore on October 15-16, 2015. It brought together 34 specialists from 15 countries in the Asia-Pacific and beyond, all attending in their private capacities. The participants joined a day and a half of not-for-attribution discussions on the Nuclear Security Summit process, nuclear governance after 2016, radioactive source management, and nuclear accident/incident response. Participants also explored a hypothetical scenario featuring a nuclear accident at a nuclear power plant in Vietnam. Key findings from the meeting include:

Over the last five years, the Nuclear Security Summit (NSS) process has helped to raise awareness, spur national action, and increase adherence to relevant international instruments. According to one participant, the NSS agenda has been all but exhausted. Nonetheless, it is unclear how momentum will be sustained after the next—and final—summit, scheduled to take place in Washington next spring. NSS stakeholders should develop a strategy to prevent backsliding and ensure continued progress.

Participants presented a number of proposals for institutionalizing the NSS process. One suggested hosting a head-of-state summit every four years, a minister-level summit every two years, and annual conferences focusing on specific issues. Others suggested having the Convention on the Physical Protection of Nuclear Material (CPPNM) hold regular conferences, including the nuclear security discussion within the Nuclear Nonproliferation Treaty (NPT) Review Conferences, or creating an international nuclear security convention.

The majority of participants thought the International Atomic Energy Agency (IAEA), which has already been active in nuclear security, would be the best candidate to take over the NSS process. Many thought that the Agency should accept South Korea's offer to cohost the IAEA's next nuclear security conference and use that as an opportunity to boost the Agency's role in nuclear security governance. Participants conceded, however, that continuing the NSS process under the IAEA umbrella would be an expansion of the Agency's mandate, requiring requisite political support and increased funding.

In Southeast Asia, nuclear power programs are still in the development phase, so priority should be given to the management of radioactive source materials. All regional states possess such materials and have a vested interest in learning how to manage them in safe and secure manner, yet there is a great deal of fragmentation between and within states about how they can detect and respond to a radioactive accident or incident. One area of focus should be strengthening and expanding the Southeast Asia Regional Radiological Security Partnership.

Countries around the Asia-Pacific should help to improve radioactive source management in the Association of Southeast Asian Nations (ASEAN) by promoting education and outreach, supporting regulation and import and export controls, and expanding storage and disposal options. Where practically and economically feasible, they should also promote technologies that can replace or phase out the most vulnerable and threatening radioactive sources.

Two of the most prominent emerging nuclear problems in Southeast Asia are nuclear waste management and potential natural disasters that may trigger nuclear accidents. In both of these areas, regional organizations such as ASEAN have a role to play in ensuring a consistent,

comprehensive nuclear governance regime. Without leadership from regional organizations, the institutionalization of nuclear governance will remain fragmented and piecemeal.

With regard to nuclear waste, ASEAN member-states should begin discussing a regional framework on spent fuel management that would devise regional strategies to manage and dispose of high-level radioactive waste. Some countries in the region considering nuclear power have unfortunately not yet prioritized nuclear waste management.

Because nuclear programs are still in development, there is a golden opportunity to establish effective nuclear safety, security, and safeguards cultures throughout Southeast Asia. There are, however, still a number of capacity-building shortfalls. Participants highlighted that the nuclear education plans in Indonesia and Malaysia are still evolving, and are thus still not comprehensive, and noted concern that the nuclear training courses in Vietnam are too theoretical.

In countries developing nuclear power, particular focus needs to be placed on preparing for possible nuclear accidents and incidents. These states should limit the population around nuclear power plants, have logistics available for potential evacuation, run drills ahead of time, ensure that public officials and the surrounding population understand nuclear risks and evacuation plans, and develop procedures for notifying the IAEA and neighboring countries if an accident or incident occurs.

There is continuing misperception about nuclear safety and security culture. To be effective, there needs to be an amalgamation of universal nuclear security standards and local practices and culture. In this regard, the nuclear security conversation should be expanded beyond nuclear experts to include local communities. One participant suggested that Southeast Asian states model the United Arab Emirates, which has conducted nuclear forums around the country to address concerns and answer questions about nuclear power.

During the discussion of a hypothetical scenario featuring a nuclear accident in Vietnam, it was emphasized that ASEAN—through a regional coordinating body—needs to be involved in responding to technological disasters triggered by natural disasters. Many participants recommended a more formal follow-on table-top exercise featuring experts and practitioners from across the region. In addition to raising awareness about the challenges involved in a nuclear accident or incident, this exercise would help tease out the gaps and limitations in the response of regional states.

ASEAN is already moving in the direction of regional disaster response with the development of the ASEAN Coordinating Centre for Humanitarian Assistance (AHA Center). This trend is promising and should be encouraged. As nuclear power expands in the region, the AHA Center should take on a greater role in nuclear safety by establishing a regional nuclear crisis center. This center should help states prepare for nuclear accidents and incidents by facilitating information exchange, coordinating regional response, conducting joint clean-up activities, and organizing workshops, training, and drills.

Nuclear security cooperation should also be enhanced through greater integration among the Asia-Pacific centers of excellence. Cooperation should focus on the joint development of standardized curricula, courses, and certification, the exchange of good practices, and the conduct of joint work in transportation security and emergency response and preparedness.

**Next Steps for Nuclear Security Governance in the Asia Pacific**  
**A Conference Report of the CSCAP Nuclear Energy Experts Group Meeting**  
**October 15-16, 2015, Singapore**  
**By Carl Baker and David Santoro**

In an effort to help institutionalize nuclear security governance in the Asia Pacific, the Pacific Forum CSIS, in partnership with the S. Rajaratnam School of International Studies (RSIS) and with the support of the Carnegie Corporation of New York, held a CSCAP Nuclear Energy Experts Group (NEEG) meeting in Singapore, Singapore on Oct. 15-16, 2015. It brought together 34 specialists from 15 countries in the Asia Pacific and beyond, all attending in their private capacities. The participants joined a day and a half of not-for-attribution discussions on the Nuclear Security Summit process, nuclear governance after 2016, radioactive source management, and nuclear accident/incident response. Participants also explored a hypothetical scenario featuring a nuclear accident at a nuclear power plant in Vietnam. The following report reflects the views of the organizers. While it has been reviewed by all participants, it is not a consensus document.

**The Nuclear Security Summit process**

Manpreet Sethi (*Center for Air Power Studies, India*) highlighted that nuclear terrorism was identified as the United States' topmost threat in 2009, laying the foundations for strengthening the nuclear security regime. This crystallized in the launch of the "Nuclear Security Summit" (NSS) process, which was held in 2010 (Washington), 2012 (Seoul), and 2014 (Amsterdam), and is set to hold its last gathering in Washington this year. The goal has been to secure nuclear and radioactive materials worldwide by raising international awareness of the threat, requiring national legislation and enforcement, enhancing national protection and control systems, setting benchmarks for progress, and promoting voluntary national reporting and sharing information and good practices to facilitate international cooperation. Plainly, it has aimed to encourage states to fulfill their responsibilities nationally and to coordinate these efforts internationally.

Much has been achieved since 2010. The need to act on nuclear security was brought to the forefront of the international security agenda and reporting by states has ensured several concrete actions and increased adherence to international treaties, notably the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT) and the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment. Numerous research reactors using highly-enriched uranium (HEU) were also converted to low-enriched uranium (LEU), excess HEU was repatriated and eliminated, and several centers of excellence (COE) focused on nuclear security were established.

In 2016, there are four primary goals. First, make progress toward HEU elimination in civilian applications. Second, work toward the universalizing of international treaties related to nuclear security. Third, increase information sharing on standards and good practices, and enhance nuclear security culture. Fourth, strengthen reporting on radioactive source management. Success in 2016 and beyond will be determined by

whether states develop habits of vigilance and sustain efforts to ensure effective nuclear and radioactive management and promote proper international and national mechanisms and procedures to ensure it. There are reasons to question whether success is likely because there has been of late a fall in momentum triggered partly by growing tensions between the United States and Russia, but also because numerous states refuse to act and cooperate sufficiently. This is problematic because, as one participant pointed out, the NSS agenda has been all but exhausted.

### **Nuclear governance after 2016**

Participants presented a number of proposals for institutionalizing the NSS process. One suggested hosting a head-of-state summit every four years, a minister-level summit every two years, and annual conferences focusing on specific issues. Others suggested having the CPPNM hold regular conferences, including nuclear security within the Nuclear Nonproliferation Treaty Review Conferences, or creating an international nuclear security convention.

Chang-hoon Shin (*Asan Institute for Policy Studies, South Korea*) argued for such a convention as an alternative to the current ad hoc and piecemeal nuclear security regime. Ideally, it would provide a clear definition and scope of nuclear security, a clear vision and goal, and a clear statement of principles for states to follow. The convention would also lay out the international standard for a national nuclear security regime, be universal, recognize the role and authority of the International Atomic Energy Agency (IAEA), and require states to report on their obligations, which would be cross-checked by a mandatory peer review mechanism. It would *not* attempt to include already existing treaties or other documents, nor would it affect existing instruments and obligations. Rather, it would aim to supplement them by filling gaps, now and in the future, leaving most decisions about the regime to a conference of parties. Of note, the Nuclear Security Governance Experts Group (or NSGEG) published a model for this convention, which is accessible online at <http://www.nsgeg.org/ICNSReport315.pdf>

Unless or until a formal regime like this can be achieved, the majority of participants thought that the IAEA, which has already been active in developing recommended measures related to nuclear security, would be the best candidate to take over the NSS process. Many thought that the IAEA should accept South Korea's offer to co-host its next nuclear security conference and use that as an opportunity to boost its role in nuclear security governance. Participants conceded, however, that continuing the NSS under the IAEA umbrella would be an expansion of the Agency's mandate, requiring requisite political support and increased funding.

Alistair Cook (*S. Rajaratnam School of International Studies, Singapore*) explained that two of the most prominent nuclear security problems in the Asia Pacific are nuclear waste management and natural disasters that may trigger nuclear accidents. In both these areas, regional organizations such as the Association of Southeast Asian Nations (ASEAN) have a role to play in ensuring a consistent, comprehensive nuclear governance regime.



With regard to nuclear waste, regional states should begin discussing a regional framework on spent fuel management that would devise strategies to handle and dispose of high-level radioactive waste; unfortunately, several regional countries that are considering nuclear power have *not* yet prioritized nuclear waste management. With regard to dealing with natural disasters that may trigger nuclear accidents, Asia-Pacific states should create a special regional coordinating body to facilitate information exchange and coordinate regional and civil-military nuclear emergency response; formulate joint efforts to clean up affected sites; organize workshops, training, and joint nuclear emergency drills for the region's radiation emergency responders; and serve as a special unit within the ASEAN Coordinating Center for Humanitarian Assistance on Disaster Management, known as the AHA Center.

### **Radioactive source management**

Robert Finch (*Sandia National Laboratories, United States*) stressed that radioactive materials used outside the nuclear power industry, which are prevalent throughout the world, including in the Asia Pacific, are a source of safety and security concern. Management of radioactive sources depends on their risk categorization, which, per IAEA standards, ranges from one to five and is detailed in the Code of Conduct on the Safety and Security of Radioactive Source and the Guidance on the Import and Export of Radioactive Sources. The problem is that these instruments are guidelines and are not legally-binding. International security standards on radioactive source management, in other words, are weak, few, and incomplete.

In these circumstances, it is essential that states improve the security of the radioactive sources. It is also critical that they increase information and intelligence sharing about threats. Improving the “second line of defense,” i.e., increasing the number of radiation detectors at key locations, is another important way to deal with the problems posed by radioactive sources, as is training of emergency first responders.

Miles Pomper (*James Martin Center for Nonproliferation Studies, United States*) explained that work should be undertaken to replace high-risk radioactive sources and materials, as detailed in the report *Permanent Risk Reduction: A Roadmap for Replacing High-Risk Radioactive Sources and Materials* (James Martin Center for Nonproliferation Studies, 2015) that he co-wrote with George Moore; it is accessible online here: <http://www.nonproliferation.org/op-23-permanent-risk-reduction-a-roadmap-for-replacing-high-risk-radioactive-sources-and-materials/>

Sabar Md Hashim (*Tenaga Nasional Berhad, Malaysia*) stressed that nuclear power programs are still in the development phase in Southeast Asia and that, as a consequence, priority should be given to the management of radioactive source materials. All regional states possess such materials and have a vested interest in learning how to manage them in a safe and secure manner, especially because there is a great deal of fragmentation between and within regional states about how they can detect and respond to a radioactive accident or incident.

Asia-Pacific countries should help improve radioactive source management in ASEAN by promoting education and outreach, supporting regulation and import and export controls, and expanding storage and disposal options. Where practically and economically feasible, and as recommended by Miles Pomper, regional states should also promote technologies that can replace or phase out the most vulnerable and threatening radioactive sources and materials. Some suggested that this is an area where the ASEAN Network of Regulatory Bodies on Nuclear Energy (ASEANTOM) could help facilitate cooperation.

### **Nuclear accident/incident crisis response**

Kaoru Naito (*Japan Engineers Federation*) described the nuclear power plant accident that took place at the Japanese Fukushima Daiichi nuclear power plant in March 2011. He concluded that despite numerous issues regarding nuclear emergency preparedness raised before the accident, regulators had not conducted a proper review. In other words, the regulator's failure to take timely action contributed to the problem. Moreover, the Japanese government's piecemeal response and lack of communication caused confusion among the evacuees, neighboring countries, and the IAEA. In other words, while the accident was caused by a natural disaster, it was made worse by poor management. Since then, Tokyo has done much to improve its response to a similar disaster, including by creating an independent regulator and revising its safety design criteria and its emergency preparedness guidelines.

Because nuclear programs are still in development in Southeast Asia, there is a golden opportunity to establish effective nuclear safety, security, and safeguards standards and cultures in parallel with the introduction of nuclear energy facilities in the region. The problem is that there are still several capacity-building shortfalls. Participants highlighted, for instance, that the nuclear education plans in Indonesia and Malaysia are still evolving, but remain limited in scope. Similarly, nuclear training courses in Vietnam are reportedly too theoretical. While the regional nuclear security centers of excellence can help plug these gaps, broader, in-country assistance is needed to ensure standards are met.

Particular focus needs to be placed on preparing for possible nuclear accidents and incidents. Southeast Asian states that plan to develop nuclear power plants should limit the population around these plants, have logistics available for potential evacuation, run drills ahead of time, ensure that public officials and the surrounding population understand nuclear risks and evacuation plans, and develop procedures for notifying the IAEA and neighboring countries if an accident or incident occurs.

### **Preliminary work on a tabletop exercise**

The meeting's second day was devoted to engaging in preliminary discussions about the principal components and phases of action of a hypothetical scenario featuring a nuclear accident in Vietnam initiated by a strong typhoon. Participants discussed the possible spread of radioactive contamination and examined the national and regional responses

that would be set in motion to manage the accident. This work was meant to lay the foundation for a full-fledged tabletop exercise in Southeast Asia, tentatively scheduled to take place in the fall of 2016, and intended to assist regional states in improving nuclear emergency preparedness and response.

The key takeaway of the exercise was that radioactive fallout to off-site (national and regional) locations would be minimal, demanding “only” implementation of facility- and provincial-level emergency procedures (not national-level procedures). Still, the accident would keep Hanoi on its toes and require intense coordination among government agencies as well as substantial liaising with international and regional organizations and neighboring countries both to share information and request assistance. It was also clear that Vietnam has worked hard to educate local communities regarding the requirements associated with the introduction of nuclear energy facilities and has already begun the planning process to prepare for disaster management capacity well ahead of the actual construction of its nuclear power facilities.

Significantly, participants emphasized that ASEAN, through a regional coordinating body, needs to be involved in responding to technological disasters triggered by natural disasters such as the one featured in this exercise. Fortunately, ASEAN is already moving in this direction with the creation of the AHA Center which, as mentioned earlier, would benefit from the establishment of a nuclear crisis center under its umbrella.

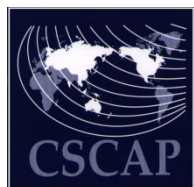
Copies of the presentations of Jor-Shan Choi from the University of California, Berkeley (on the spread of contamination) and Nguyen Nhi Dien from the Vietnam Nuclear Research Institute (on Vietnam’s response) are accessible online at <http://csis.org/event/4th-nuclear-energy-experts-group-meeting-neeeg>

### **General observations and next steps**

Progress on nuclear governance in the Asia Pacific will result from an improvement of nuclear safety and security *culture*. In other words, there needs to be an amalgamation of universal nuclear security standards and local practices and culture. In this regard, the nuclear security conversation should be expanded beyond nuclear experts to include local communities. Interestingly, one participant suggested that Southeast Asian states model the United Arab Emirates, which has conducted forums around the country to address concerns and answer questions about its current and planned nuclear activities. This is a long and difficult endeavor, but the only one likely to pay dividends as regional states will increase their nuclear activities. This, again, calls on greater action by regional organizations, namely ASEAN.



## Appendix A



**COUNCIL FOR SECURITY COOPERATION IN THE ASIA PACIFIC  
Nuclear Energy Experts Group (NEEG) Meeting  
Grand Park City Hall, Singapore, October 15-16, 2016**

### **Agenda**

#### **Wednesday, October 14, 2015**

18:30 **Opening Dinner**

#### **Thursday, October 15, 2015**

8:45 **Registration/Welcome**

9:15 **Session 1: The Nuclear Security Summit Process**

This session will focus on the role of the Nuclear Security Summit process. How much progress has it made since it was initiated in 2010? What specific progress has it made in the Asia Pacific? What should the priorities and expectations be for the 2016 Summit? What would constitute success? What would constitute failure?

Speaker: Manpreet Sethi

10:45 **Coffee Break**

11:00 **Session 2: Nuclear Governance after 2016**

This session will look at nuclear governance post-2016. What are the options to strengthen nuclear safety and security governance after the 2016 Summit? Is an international convention on nuclear security viable? What would it look like? What are the pros and cons? What are the alternatives? Should there be a specific nuclear governance mechanism for the Asia Pacific?

Speakers: Chang-Hoon Shin

Alistair Cook

12:30 **Lunch**

13:45 **Session 3: Radioactive Sources Management**

This session will examine the management of radioactive source materials used outside the nuclear power industry. What are high-risk radioactive source materials? To what extent are they prevalent in the Asia Pacific? How are they managed, both in facilities and while being transported? What are the opportunities and challenges to improve management of radioactive material sources in the Asia Pacific?

Speakers: Miles Pomper

Sabar Bin Md Hashim

15:15 **Coffee Break**

15:30 **Session 4: Nuclear Accident/Incident Crisis Response**

This session will examine responses to a crisis situation involving a nuclear reactor. What are the standard responses, as laid out by the International Atomic Energy Agency (IAEA), to a nuclear crisis? What are the different phases of response? How have these responses evolved after the Fukushima accident? Besides the IAEA, what international organizations have roles and responsibilities in a nuclear crisis? In Asia, what regional organizations have a mandate to act in a nuclear crisis?

Speaker: Kaoru Naito

17:00 **Session adjourns**

18:30 **Dinner**

**Friday, October 16, 2015**

The NEEG's second day will be devoted to running a table-top exercise (TTX) involving a nuclear accident in Vietnam. The TTX will seek to assess the spread of radioactive contamination and, more importantly, examine the national and regional responses set in motion to manage the accident in an attempt to highlight gaps and limitations and make recommendations for policy.

9:00 **TTX Goals and Scenario**

Introductory remarks about TTX goals and presentation of the scenario.

9:15 **Focus Area 1: The Spread of Contamination**

The first focus area will assess the spread of radioactive contamination and discuss the implications for response management and mitigation.

Moderator: Jor-Shan Choi

10:15 **Coffee Break**

10:30 **Focus Area 2: The National Response**

The second focus area will discuss the immediate, Vietnamese response to the accident, including what it would likely entail and how it would play out.

Moderator: Nguyen Nhi Dien

11:30 **Focus Area 3: The Regional Response**

The third focus area will discuss the broader regional response to the accident, with a special focus on ASEAN.

Moderator: Carl Baker

12:30 **Lunch**

13:30 **Meeting Adjourns**

## Appendix B



**COUNCIL FOR SECURITY COOPERATION IN THE ASIA PACIFIC  
Nuclear Energy Experts Group (NEEG) Meeting  
Grand Park City Hall, Singapore, October 15-16, 2016**

### Participant List

1. **ANG Kok Kiat**  
Director  
Radiation Protection and Nuclear  
Science Department  
National Environment Agency
2. **Carl BAKER**  
Director of Programs  
Pacific Forum CSIS
3. **Jonathan CAPEL (rotating)**  
Deputy Director, Crisis  
Preparedness Directorate  
Joint Operations Group
4. **Denise CHEONG**  
Research Fellow  
Centre for International Law  
National University of Singapore
5. **Alvin CHEW**  
Adjunct Fellow  
S. Rajaratnam School of  
International Studies
6. **Jor-Shan CHOI**  
Associate Director  
Berkeley Nuclear Research  
Center, Nuclear Engineering  
Department, University of  
California, Berkeley
7. **Alistair COOK**  
Research Fellow  
Centre for Non-Traditional  
Security Studies, S. Rajaratnam  
School of International Studies
8. **Robert FINCH**  
International Nuclear Threat  
Reduction  
Sandia National Laboratories, US  
Department of Energy
9. **Trevor FINDLAY**  
Associate, Project on Managing  
the Atom  
Belfer Center for Science and  
International Affairs  
Harvard University
10. **Gregory FOO (rotating)**  
Director, Security Policy  
Directorate  
Joint Operations Group
11. **Francesca GIOVANNINI**  
Program Officer  
Global Nuclear Future,  
American Academy of Arts and  
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12. **Karen HOGUE**  
Senior Security Specialist  
Gregg Protection Services
13. **Jamal Khaer IBRAHIM**  
Director  
Nuclear Power Programme  
Development, Malaysia Nuclear  
Power Corporation

14. **Monica KANG**  
Project Manager, CRDF Global  
Non-Resident Kelly Fellow,  
Pacific Forum CSIS
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Technology, Myanmar
16. **LIM Hock**  
Director (Research Governance  
and Enablement), National  
University of Singapore  
Head of the Singapore Nuclear  
Research and Safety Initiative
17. **Sabar MD HASHIM**  
Senior Manager  
Regulatory Relations and  
Management Department,  
Corporate Affairs  
Division, Tenaga Nasional  
Berhad, Malaysia
18. **Mohd Pauzi bin MOHD SOBARI**  
Deputy Director General  
Atomic Energy Licensing Board,  
Malaysia
19. **Kaoru NAITO**  
Senior Advisor  
Japan Engineers Federation
20. **NGUYEN Nhi Dien**  
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National Research Institute,  
Vietnam
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Chulalongkorn University,  
Thailand
22. **Tuya NYAM-OSOR**  
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Institute for Strategic Studies
23. **POK Marina**  
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Cambodian Institute for  
Cooperation and Peace
24. **Miles POMPER**  
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26. **Vladimir RYBACHENKOV**  
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Studies, Department of War  
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30. **Chang-Hoon SHIN**  
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31. **Andrew STUCHBERY**  
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32. **SU Yi-Yuan**  
Assistant Professor  
Department of Law  
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