Policy Forum 11-40: The 2012 Nuclear Security Summit: Opportunities and Challenges


The NAPSNet Policy Forum provides expert analysis of contemporary peace and security issues in Northeast Asia. As always, we invite your responses to this report and hope you will take the opportunity to participate in discussion of the analysis.

Recommended Citation

Duyeon Kim, "Policy Forum 11-40: The 2012 Nuclear Security Summit: Opportunities and Challenges", NAPSNet Policy Forum, November 22, 2011, https://nautilus.org/napsnet/napsnet-policy-forum/the-2012-nuclear-security-summit-opportunities-and-challenges/

By Duyeon Kim

November 22, 2011

This paper was originally published by the Korea Economic Institute on September 28 2011 and is available here.

Nautilus invites your contributions to this forum, including any responses to this report.

CONTENTS

I. Introduction

II. Report by Duyeon Kim

III. References

IV. Nautilus invites your responses

I. Introduction



South Korean President Lee Myung Bak at the 2010 Nuclear Security Summit in Washington, DC.

Duyeon Kim, Deputy Director of Non-Proliferation at the Center for Arms Control and Non-Proliferation, writes, “There are clear ways in which Seoul can capitalize on its strengths to flavor the 2012 [Nuclear Security Summit] with a “Korean twist” as it maintains depth on key substantive issues that ensure the security of nuclear materials, parts, and facilities…The challenge lies in clearly demonstrating that the benefits outweigh the costs, and that states would have a national interest in further investing their political capital in nuclear security."

The views expressed in this report do not necessarily reflect the official policy or position of the Nautilus Institute. Readers should note that Nautilus seeks a diversity of views and opinions on significant topics in order to identify common ground.

II. Report by Duyeon Kim

-“The 2012 Nuclear Security Summit: Opportunities and Challenges”

by Duyeon Kim

Introduction

The March 2012 Nuclear Security Summit (NSS) in Seoul, Korea comes at a critical juncture. Global terrorist attacks have prompted concerns about nuclear terrorism, and many states may continue to shop for nuclear reactors to meet their energy supply needs despite the horrific incident at Japan’s Fukushima Daiichi nuclear power plant. Nightmare scenarios include vulnerable nuclear materials falling into the wrong hands or being smuggled across borders, and nuclear facilities becoming targets for terrorist attacks. The NSS also comes after the Fukushima Daiichi nuclear disaster reminded the world that the force of nature, combined with the force of malice, threatens the safety features of nuclear facilities that are intended to protect, not harm, life.[1] Against this backdrop, some 50 world leaders are charged with the difficult task of agreeing on measures that will secure

vulnerable materials around the world.

Official negotiations on crafting the 2012 NSS agenda and the Seoul Communiqué convened among Sous Sherpas [2] on June 27, 2011 in Seoul as participating countries began assembling a draft communiqué. [3]Discussions kicked off with 10 key items on the table, and it remains to be seen if and how they will be included in the Seoul Communiqué next year. [4] Sherpas continued to massage the Communiqué on October 4th in Helsinki focusing on roughly eight key points, [5] and will aim to finalize the text in mid-January 2012 in New Delhi before adopting the document at the March Summit. The goal is to formulate responsibilities, commitments and actionable steps that are politically acceptable for state leaders, as well as consistent with national and international regulations. Their approach is guided by five principles for drafting the Communiqué. [6]

It is important that the all-encompassing document not only ensures full implementation of the results of 2010 summit, but also deepens those results and prioritizes measures to deal with pressing nuclear security dilemmas of today and tomorrow. It is also important that it include new items that will continue to attract heads of state to the NSS process while maintaining the central focus on nuclear security.

Such is the task for the Republic of Korea as the chair and host of the 2012 NSS. Taking into account its unique position on the global stage, Seoul brings to the table certain characteristics that will serve as both opportunities and challenges for the NSS.

The Washington summit rightfully focused narrowly on nuclear security. With Fukushima adding a new twist, Seoul is uniquely positioned to lead a summit with a more global focus. It is a non–nuclear weapons state that has proven to be a responsible member of the Nuclear Non-Proliferation Treaty (NPT) and a host of other international regimes and institutions. Its 21 reactors provide almost 40 percent of the country's electricity with five more reactors under construction, and Korea is becoming a competitive nuclear exporter in the world energy industry. It is a non–nuclear weapons state with a nuclear-armed neighbor, North Korea, in its backyard. Seoul can play a vital role in bridging the nuclear and non–nuclear weapons states as well as the developed and developing states.

Against this backdrop, there are clear ways in which Seoul can add a Korean flair to the upcoming summit while leading more intensified efforts to prevent nuclear terrorism.

Nuclear and Radiological Safety-Security [7]

If the 2010 Washington Summit was a reaction to 9-11, then the 2012 Seoul Summit will in part be a reaction to Fukushima. March 2011 was another wakeup call that the world is not free from nuclear accidents and signaled that a Fukushima-like incident caused by malefactors or terrorist groups with access to nuclear facilities is a real threat.

The Fukushima disaster provided the impetus to broaden the Seoul 2012 NSS agenda to include nuclear safety—more specifically, the nexus of safety and security—as well as to place a higher priority on radioactive materials.

Nuclear safety (accidents) and nuclear security (malicious intent) are indeed very different concepts, but they both share a common denominator and objective—to protect life. Just as the 2011 United Nations system-wide study on Fukushima states, "there are several common characteristics shared by accidents and sabotage, such as reduced effectiveness of remaining systems, including through the loss of power, communications, computer, safety and physical protection systems; and the loss of key operating, safety and security personnel." [8]

At the 2012 Summit, world leaders could acknowledge the relationship between nuclear safety and nuclear security, and then agree on implementing safety-security steps to create synergies that reinforce each other. Sufficient discussion on nuclear safety vis-à-vis security could naturally draw attention and interest from heads of state who would otherwise place a lesser policy priority on nuclear security. The safety-security discussion can also sustain the participation of some states that believe sufficient work that does not need further summit-level attention already exists on nuclear security from the 2010 Washington Summit.

The main obstacle in garnering adequate attention for the nuclear safety-security nexus is the gap in perception and interest among states. International awareness and consensus on the need to strengthen safety and security measures have grown quickly since Fukushima. However, the translation of such awareness into concrete action remains unclear, due to differing national interests and in light of the currently ostensible priority gap between Seoul and Washington on the need to highlight this issue in the Seoul Communiqué.

At the September 2011 UN high-level meeting, Korean President Lee Myung-bak said Seoul is "keen to contribute to the peaceful use of nuclear energy by leading the 2012 Seoul Nuclear Security Summit to a success." [9] In its pursuit to become a competitive nuclear exporter and enjoy prestige in the nuclear industry, Korea would need validation by a communiqué that adequately includes the nuclear safety-security interface. While strengthened safety-security measures could help restore the public's confidence in nuclear energy, the verdict on whether the Seoul Communiqué is deemed a success for nuclear safety-security may eventually be determined by the interpretation of the language by respective countries.

Nuclear power plants and facilities. Fukushima demonstrated that terrorists and malefactors can re-create the same conditions—damaging a reactor's cooling system and diesel generator, and cutting the supply of on-and off-site power to the reactor—all of which could lead to a meltdown and radiation leaks.

Summit participants could begin by working nationally, bilaterally, or multilaterally to implement stronger safety-security measures at nuclear power plants and facilities, including protecting stored spent nuclear fuel, against sabotage, attack, and insider threats, pursuant to and building upon the recommendations outlined by the IAEA Nuclear Security Series documents. [10] Safety and security considerations must be built into a plant throughout all phases of its service life. The challenge would be to persuade states that may be wary of allocating additional funds to implement stronger safety-security measures.

The possibility of combined natural and malicious disasters warrants their consideration in integrated and complementary nuclear safety-security plans for nuclear facilities. Safety personnel (operators, engineers, and technicians) and the security staff (military, police, and guards) must be able to respond harmoniously in the overall emergency planning. [11]

Actionable steps should be coordinated and applied vertically from the highest level of international legal frameworks down to national legislation and human resources development, as well as horizontally among nuclear facilities, infrastructure, and organizations that transport nuclear material and use radioactive materials. Instilling the right habits and traits in responders—the right culture—is critical. Leadership and management need to be demonstrated at the highest levels—innovative governance—to ensure effective coordination and balance between safety and security. This could be a challenge for nuclear "newcomers" and amid a steady post-Fukushima trend among some states, particularly in Asia, that continue to opt for nuclear power to meet their energy needs.

Radioactive materials. As a representative of a state that possesses neither nuclear weapons nor fissile materials, Seoul is apparently placing a higher priority on securing radioactive sources. For some countries, the threat of a "dirty bomb" that disperses radioactive materials is considered greater than or as serious as that posed by a nuclear weapon, although nuclear weapons states do recognize the serious risks posed by them.

Hundreds of medical and industrial radioactive sources are said to be abandoned, stolen, or lost each year, thus constituting both safety and security concerns. The threat of radiation leaks or loss of control over radioactive materials caused by nature, internal system failures, or malicious intent could be included in this category of discussions as well as radiological terrorism prevention.

Radiological terrorism or sabotage—either through the use of a radiological device (radiological dispersal device or radiation-emitting device) [12] or attacks on nuclear facilities—would be an attractive means for terrorists to cause public fear and serious damage.

The ROK could also capitalize on its renowned technology for tracing and tracking radioactive sources by setting an example and sharing its know-how with summit participants. [13] World leaders could also discuss ways to export Korea's tracking technology.

Nonproliferation via Nuclear Instruments and Legal Frameworks

As a country that shares a border with a nuclear-armed regime, the ROK will find it difficult to ignore a discussion on nonproliferation due to its nuclear proliferating northern neighbor, particularly since the crux of nuclear security is ensuring that vulnerable nuclear materials do not fall into the hands of terrorists or rogue regimes. Seoul may wish to highlight nonproliferation in the context of implementing nuclear instruments and legal frameworks that prohibit and criminalize the illegal trafficking and smuggling of nuclear parts, materials, and know-how. This focus would prevent both repeating existing nonproliferation discussions in other international forums and legitimizing, for example, North Korea's nuclear programs as well as those of other states and actors that are not signatories of the NPT.

UN Secretary-General Ban Ki-moon's September 2011 report stressed that "in order to properly address nuclear security, the international community should promote universal adherence to and implementation of relevant international legal instruments." [14] Korea should prod world leaders to not only support the objectives of key, international nuclear security instruments stipulated in the 2010 NSS Communiqué [15] but to ratify, commit to, and strengthen them. The summit chair should drum up more support for aggressively and fully implementing three key instruments and initiatives in particular: the Convention on the Physical Protection of Nuclear Materials (CPPNM, including its 2005 Amendment) and the International Convention on the Suppression of Acts of Nuclear Terrorism or ICSANT), as well as UN Security Council Resolution 1540.

A priority for the NSS could be to rationalize the existing legal frameworks by designating, with certain organizational adjustments, the IAEA to help coordinate the relevant national, regional, and multilateral bodies. [16] Practical measures that have been proposed by some experts include harmonizing national laws and seeing that law enforcement, intelligence agencies, emergency responders, the nuclear industry, and civil society organizations for the stringent implementation of the laws. [17]

IAEA and Subsequent Summits

The NSS should further empower the IAEA as the essential adviser and provider of guidelines and assistance. It is important that the Summit does not replace the IAEA, whose mandate should be

updated frequently to adequately fulfill new tasks and respond to evolving nuclear threats. The NSS would be integral in injecting the political force necessary for full implementation which may otherwise be difficult in forums like the IAEA and UN. They can also help breed and integrate security cultures into their national cultures and governance. Another clear advantage of the NSS is helping the IAEA fundraise to support nuclear security programs.

A third summit would help complete President Obama's four-year objective, cement the 2010 agreements and address evolving future threats. It would prove helpful for Seoul to strategize near-term (second summit) and medium-term (third summit) goals when crafting the 2012 agenda. A Seoul summit with a slightly expanded scope could be the turning point to further broaden future agendas to meet evolving security challenges.

Broadening the agenda to include safety-security will not necessarily dilute the NSS as long as leaders remain committed to the central focus of nuclear security. For example, the 2010 Washington Summit included radioactive sources but with a lesser degree of importance. While the future geopolitical security landscape is uncertain, expanding the agenda again in 2014 to include, for example, safeguards, may become a natural undertaking.

It would be worthwhile to approach, preferably by 2011, a third NSS chair that understands the objectives of both Seoul and Washington. It may be effective to pass the baton to Russia, or a European country like France that is also interested in addressing nuclear safety issues. Another symbolic option could be a BRIC country, although it may be useful to alternate regions. The chairmanship would provide the opportunity to steer and shape the future nuclear discourse. A Troika-like system should be applied officially or unofficially if world leaders agree to continue the summits.

Summits after 2014 are necessary to maintain urgency of nuclear security at the highest governmental level and ensure proper implementation. Once nuclear security measures are normalized, the Summit process could be brought down to the senior or working level of governments. It may also prove worthwhile for Washington to continue spearheading full implementation of key 2010 initiatives despite a change in chairmanship, while Seoul could be responsible for seeing through its initiatives. For example, the US could continue to track the bulk of country commitments in which it has resources and leverage, such as the minimization of highly enriched uranium (HEU).

The creation of an "observer" category could be considered in future summits for states that would otherwise be deemed as "spoilers." The purpose would be to eventually expose more countries to best practices, and would serve to further raise awareness while preventing obstacles in securing unanimous consensus on NSS agreements.

North Korea

It is unrealistic to expect a direct or substantial discussion on North Korea at the NSS. It would, however, be a grave loss for Seoul if leaders neglect to mention their biggest security threat at the largest nuclear summit hosted in its own home court. Since the NSS aims to secure fissile materials in participating countries, the challenge will be to deal with it in a manner that does not legitimize Pyongyang's nuclear programs. The reclusive regime's facilities may be the installations most secure from outsider threats, but their safety and proliferation activities remain a concern. The challenge would be to draw a line between the NSS and the Six Party Talks and the NPT.

President Lee has repeatedly extended a conditional invitation to North Korean leader Kim

Jong-il. [18]Possible eligibility requirements for the North's participation as an NSS observer could be returning to the status and spirit of the September 2005 Joint Statement, and resuming the Six Part Talks before the NSS. Attending the summit would also be an opportunity for Pyongyang to be included in an international forum as Fukushima would have sent a safety alert to the regime.

It would be politically difficult, if not impossible, to explicitly name North Korea in the Seoul Communiqué. However, ambiguous language can be chosen without mentioning North Korea, but with clear implications. For example, possible language could include "calling on all states, regimes, and non-state actors with aspirations to acquire or develop nuclear weapons or nuclear parts, as well as those in violation of the Nuclear Non-Proliferation Treaty, to surrender their weapons ambitions, roll back existing nuclear programs, and enjoy greater benefits as responsible international players and users of peaceful nuclear energy while cooperating multilaterally to secure all vulnerable nuclear and radioactive materials." It could also "call on nuclear-armed states and aspirants currently in violation of the NPT to refrain from transferring nuclear materials, parts, technology, and know-how."

At the very least, President Lee could reiterate in speeches and conversations the imperative of resolving the North Korean problem at an early date, particularly in light of Pyongyang's November 2010 disclosure of its uranium enrichment program. States involved in the Six-Party Talks could also use the summit to engage in bilateral and multilateral side discussions on the North Korean issue.

Conclusion

As the 2012 NSS chair, the ROK brings clear advantages and capabilities to the table in leading the global nuclear security initiative. It is critical that the 2012 NSS goes beyond the pledges made in 2010 and agree to take concrete, actionable steps. It is important to have an all-encompassing 2012 Communiqué that does not compromise or sacrifice depth and quantity of actionable steps.

There are clear ways in which Seoul can capitalize on its strengths to flavor the 2012 Communiqué with a "Korean twist" as it maintains depth on key substantive issues that ensure the security of nuclear materials, parts, and facilities:

- Seoul could ensure the adequate stipulation of strengthened and synergistic nuclear safety-security measures in the Seoul Communiqué;
- Seoul could persuade more states to sign, ratify, and implement key nuclear security instruments and conventions;
- Seoul could adequately address the North Korean nuclear issue and other outlier states by, for example, enhancing UNSC Resolution 1540 implementation targeting Pyongyang's provisions to non-state actors' proliferation activities;
- Seoul could help strengthen the IAEA to further assist national regulators;
- Seoul could approach, at the earliest possible date, a like-minded candidate for the 2014 NSS chair such as Russia or France to strategize the agenda for follow-on summits, and discuss ways to further expand the scope of the NSS agenda to address evolving nuclear threats;
- Seoul could further contribute to global nuclear security by sharing its knowledge and expertise in other key areas, including the tracking of radioactive sources and the conversion of HEU to low enriched uranium (LEU) as a leading example of a country that cleaned out its U.S.-origin HEU and developed LEU-based fuels. [19]

Seoul is tasked with the responsibility and challenge to not only chair a major international summit, but show effective leadership by furthering the 2010 nuclear security goals while leaving behind its legacy. The slightly broader agenda for the 2012 NSS pressures Seoul to prove that an expanded Communiqué can provide an effective means to combat nuclear and radiological terrorism.

Diplomacy will serve to be an increasingly integral tool in garnering consensus and implementing nonbinding guidelines to secure vulnerable nuclear materials. Political force needs to be injected into nuclear security measures from the summit level to help certain states alleviate major domestic budgetary and bureaucratic hurdles.

Concrete steps are needed in order for the 2012 Seoul Summit to implement the ideas conceptualized at the 2010 Washington Summit. The fundamental challenge for world leaders going forward will be overcoming political and diplomatic hurdles in all areas of nuclear security. Some states may be reluctant to discuss certain issues at the NSS, preferring to deal instead with them at other forums such as the International Atomic Energy Agency (IAEA). Sovereignty and confidentiality issues may also prevent deepening certain nuclear security measures.

Another key challenge is crafting a 2012 agenda and Communiqué that will maintain the attention and interest of all participating states on the need for a global nuclear security initiative at the summit level.

While March 2012 may be a chance for the Lee administration to raise Korea's international profile, the NSS would in part be a barometer of success on nuclear safety-security and key nuclear security priorities. The challenge lies in clearly demonstrating that benefits outweigh the costs, and that states would have a national interest in further investing their political capital in nuclear security.

The ROK is faced with two dilemmas: it carries with it the responsibility of dealing with both nuclear security linked to North Korea and nuclear terrorism, and nuclear safety linked to the implications of Fukushima on Korea and in waters shared by neighboring China and Japan. But the NSS is also an opportunity, as well as a challenge, for Seoul to show effective leadership in deepening global nuclear security measures, particularly in a busy political year that will be dominated by domestic issues soon after the close of the summit.

III. References

[1] Igor Khripunov and Duyeon Kim, "Nature and Malice: Confronting Multiple Hazards to Nuclear Power Infrastructure," Bulletin of the Atomic Scientists, 7 September 2011.

[2] "Sous Sherpa" is the term given to the deputy negotiators responsible for crafting the agenda, communiqué, and work plan for the NSS. "Sherpa" refers to lead negotiators.

[3] The 2012 Seoul NSS will adopt one detailed document—the Seoul Communiqué—in contrast with the two documents of the 2010 Washington NSS, which also adopted the Work Plan.

[4] Sherpas began the 2012 NSS discussion in June 2011 with 10 issues most interested by participants in 2011: 1. Management guidelines for highly enriched uranium (France), 2. Transportation security (Japan), 3. Illicit trafficking (Jordan), 4. Nuclear forensics (Netherlands), 5. Nuclear security culture (Russia), 6. Treaty ratification (Indonesia), 7. Coordination of existing initiatives (Pakistan), 8. Information security of sensitive technology and knowledge (UK), 9.

Radioactive sources (Germany, Korea), 10. Nuclear safety and security (Korea).

[5] Key nuclear security measures discussed at Helsinki include: (1) securing high-risk nuclear materials such as highly enriched uranium and plutonium (2) enhancing the protection of nuclear facilities (3) creating synergy between nuclear security and nuclear safety (4) preventing the illicit trafficking of nuclear materials (5) tightening the management of radioactive materials that could be used in dirty bombs (6) encouraging states to join and ratify the International Convention on Suppression of Acts of Nuclear Terrorism and the Convention of the Physical Protection of Nuclear Materials, the two key nuclear security-related conventions (7) bolstering the global nuclear security architecture such as the Global Initiative to Combat Nuclear Terrorism, G8 Global Partnership, and the UNSC 1540 Committee, and (8) expanding support for the IAEA's nuclear security activities. Source: Ministry of Foreign Affairs and Trade, Republic of Korea.

[6] Five Principles in drafting the Seoul Communiqué proposed by Korea, the 2012 NSS Chair: (1) placing nuclear security at the center of the discussion (2) ensuring the continuity of the Washington Nuclear Security Summit, while at the same time, making new progress (3) ensuring the voluntary nature of national commitments and participation (4) opting against the creation of a new regime and (5) respecting President Obama's vision to secure all vulnerable nuclear material in a four-year lockdown. Source: Ministry of Foreign Affairs and Trade, Republic of Korea.

[7] This paper will use the term "nuclear safety-security" to refer specifically to the areas of overlap, or the interface of nuclear safety and security, as one combined concept as opposed to two separate concepts.

[8] Report of the (UN) Secretary-General presented at the High-Level Meeting on Nuclear Safety and Security convened by the Secretary-General, "United Nations System-Wide Study on the Implications of the Accident at the Fukushima Daiichi Nuclear Power Plant." 22 September 2011, New York, p. 20.

[9] "Address by H.E. Mr. Lee Myung-bak, President of the Republic of Korea at the High-Level Meeting on Nuclear Safety and Security," Permanent Mission to the United Nations, New York, 22 September 2011.

[10] "Nuclear Security Guidelines," IAEA, www-ns.iaea.org/security/nuclear_security_series.asp.

[11] Igor Khripunov and Duyeon Kim, "Time to Think Nuclear Safety-Security," Korea Times, 8 August 2011.

[12] A radiological dispersal device (RDD) contains radioactive materials that can be spread over a wide area and does not result in a nuclear explosion nor is a nuclear bomb. A popular type of RDD is a "dirty bomb." A radiation-emitting device (RED) is a more passive form of radiological terrorism that exposes people to radioactive sources over a short or long period of time. See "Radiological Terrorism Tutorial," Nuclear Threat Initiative, http://www.nti.org/h_learnmore/radtutorial/chapter01_02.html.

[13] Korea's systems to trace and track radioactive sources: Radiation Safety Information System (RASIS); Computerized Technical Advisory Systems for a Radiological Emergency (AtomCARE); Radiation Sources Location Tracking System (RADLOT); Integrated Environmental Radiation Monitoring Network(IERNet). Source: Korea Institute for Nuclear Safety.

[14] Report of the (UN) Secretary-General presented at the High-Level Meeting on Nuclear Safety and Security convened by the Secretary-General, "United Nations system-wide study on the implications of the accident at the Fukushima Daiichi nuclear power plant," 22 September 2011, New York, p.20.

[15] For the full text of the 2010 Communiqué, see "Communiqué of the Washington Nuclear Security Summit," White House, Office of the Press Secretary, 13 April 2010, http://www.whitehouse.gov/the-press-office/communiqu-washington-nuclear-security-summit

[16] Fissile Materials Working Group, "Strengthening Nuclear Security: The Legal Agenda," The Bulletin of the Atomic Scientists, 8 April 2010, http://thebulletin.org/web-edition/columnists/fissile-materials-working-group/strengthening-nuclear-security-the-legal-agen

[17] Ibid.

[18] On 9 May 2011 in Berlin, President Lee said, "I offer a proposal to invite Chairman Kim Jong-il to the Nuclear Security Summit on March 26–27 next year if North Korea agrees with the international community that it will be firm and sincere about giving up nuclear programs." This is in line with a similar comment he made after the 2010 Washington NSS when he stated that he would "gladly invite" Pyongyang to the follow-on summit if the regime rejoins and complies with the NPT and demonstrates a clear commitment to denuclearization.

[19] In September 2007, the U.S. repatriated all of its HEU fuel from the ROK by removing 11 fresh fuel assemblies containing approximately 1.8 kg of HEU from research reactors 1 and 2 located at the Korea Atomic Energy Research Institute in Daejeon, Korea. For details, see: "NNSA Removes All U.S.-Origin Highly Enriched Uranium Fuel from the Republic of Korea," National Nuclear Security Administration Press Release, 19 September 2007.

IV. Nautilus invites your responses

The Northeast Asia Peace and Security Network invites your responses to this report. Please send responses to: bscott@nautilus.org. Responses will be considered for redistribution to the network only if they include the author's name, affiliation, and explicit consent.

View this online at: https://nautilus.org/napsnet/napsnet-policy-forum/the-2012-nuclear-security-summit-opportunities-and-challenges/

Nautilus Institute
608 San Miguel Ave., Berkeley, CA 94707-1535 | Phone: (510) 423-0372 | Email: nautilus@nautilus.org