AMERICAN SECURITY PROJECT

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Lockheed Martin Outlines Plans for Nuclear Fusion Reactor

Theodore MacDonald

20 February, 2013

Lockheed Martin caused quite a stir in the nuclear energy industry as it announced plans to begin work on a nuclear fusion reactor. Speaking at the recent Google "Solve for X" conference on February 7, Charles Chase of Lockheed's "Skunk Works" said that a prototype 100-megawatt nuclear fusion machine will be tested in 2017, and that a fully operational machine should be grid-ready ten years from now.

This project is significant because the Lockheed reactor design is smaller than other proposed prototypes. Its design will use a compact cylinder, rather than a traditional bulky ring, and provide a stronger magnetic containment field. This leaves fewer points of weakness where energy can escape than in traditional designs. It could also make the reactor small enough for a truck to transport, yet strong enough to generate power for thousands of homes.

Today, nuclear power plants around the world utilize fission power, which involves the splitting of atoms to release energy for electricity. By contrast, nuclear fusion would fuse together two isotopes of the element hydrogen; the subsequent reaction formed after creates a large amount of energy. An ASP Fact Sheet on Nuclear Fusion noted that fusion energy is safe, clean, and has the potential to deliver an abundant amount of electricity. However, it has been difficult to produce nuclear fusion today for a number of reasons.

One difficulty in harnessing fusion power is a control issue. If the energy from fusion can be released slowly, it can be used to produce electricity. But an effective way to do so has not yet been discovered, and scientists are still trying to overcome the problems associated with controlling nuclear fusion. It is also enormously expensive to work on nuclear fusion projects; one such example of this is the ITER experiment in southern France.

These impediments have not stopped scientists from working on nuclear fusion projects over the last few decades. An experiment at Sandia National Laboratories this past year focused on making small cylinders able to withstand the powerful magnetic force that is the result of nuclear fusion. Other countries, such as China, Russia and France are researching nuclear fusion, and the National Ignition Facility is helping collaborate on fusion experiments with scientists in South Korea, Japan, and the United Kingdom.

The Lockheed Martin proposal should create a sense of optimism for proponents of nuclear fusion. Their project is just one way of stressing the importance of nuclear fusion.

ASP's Fusion 20/20 sheds more light on why fusion power is part of our future, and should be an important resource to invest in. With constant research and innovation into this field, nuclear fusion can turn from a scientific fantasy into an incredible reality.

Water Sharing Between India and Pakistan: An Opportunity for Cooperation

Dhanasree Jayaram

15 April, 2013

Note from Andrew Holland: *This is a guest post by Dhanasree Jayaram, a Ph.D. candidate in the Department of Geopolitics and International Relations at Manipal University, Karnataka, and an associate fellow at the Centre for Air Power Studies in New Delhi. This post gives an important view on how water resources in the Subcontinent could provide both opportunities for cooperation as well as challenges to conflict. You can see more of our work in this area in our ‹Perspectives› article, «The Dams of the Himalayas» and these blog posts: here, here, and here (from my previous job).*

The Letter of the Law

In February, the International Court of Arbitration issued a ruling partial award on the Kishanganga Dam dispute between India and Pakistan over the Indus River. This might succeed in bringing certain sense of closure to some of the differences that exist between India and Pakistan on the sharing of the waters of the Indus Basin - but the legal and political battles are far from over. The award will allow India to establish a hydro-electric dam on the Neelum, albeit under strict conditions that includes amendment to the design and operations of the dam.

Several factors have complicated Indo-Pakistan water sharing relations in the past and will continue to do so in the future. Under the Indus Waters Treaty (IWT) brokered by the World Bank in 1960, India was granted exclusive rights over the waters of the Eastern Rivers – the Sutlej, the Beas and the Ravi – and their tributaries before the point where the rivers enter Pakistan, while Pakistan won the rights over the waters of the Western Rivers – the Indus, the Jhelum and the Chenab – and their tributaries.

Pakistan's share of the total Indus system is over 80 percent which makes India a beneficiary of less than 20 percent.

In the past decade, there have been many disputes over India and Pakistan's shared waters: the construction of Baglihar Dam on the Chenab by the Indian side was obstructed by Pakistan. When Pakistan had moved the World Bank for arbitration, the latter appointed a neutral expert, Richard Laffite who gave green light to the project in 2007 thwarting the objections raised by the former about the structure and design of the dam.

Stresses to Current Laws

In Pakistan, there is increasing fear of water and food insecurity, a country that is entirely dependent on the waters of the Indus (and its tributaries). Pakistan fears that India has plans to construct 155 hydropower projects on the Indus, Jhelum (74) and Chenab (56), the three rivers that were assigned to Pakistan under the IWT. This number has however not been confirmed by the Indian authorities. Studies show clearly that the per capita availability of water is declining in both countries due to diminishing river flows, overexploitation of groundwater (causing salinity), low conveyance efficiency and pollution of rivers.

Climate change is also exacerbating the situation and it could only worsen in the future as the Indus is one of those rivers that have maximum dependence (151 percent) on glacial meltwater. One study states, "Based on current projections, the Indus River system is expected to fall below 2000 flow levels between 2030 and 2050. The drop-off is estimated to be most serious between 2030 and 2040, with a new equilibrium flow of 20 percent below that of 2000 reached after 2060."

On the politics side of the debate, Pervez Musharraf, former President of Pakistan claimed in his dissertation that the Kashmir dispute was primarily based on the distribution of the waters of the Indus and its tributaries between India and Pakistan. Stressing on the fair distribution of waters, he asserts, "If one were re-

solved, the other would not exist." A few reports have also suggested that Pakistan would not hesitate to use its nuclear weapons against India if the latter chokes water supply to its territory.

The present treaty has also been unpopular in India, and its Government has been under constant pressure to review it and even compensate local residents for the losses (mainly agricultural) incurred on account of the treaty. The legislative council of Jammu and Kashmir passed a resolution in 2002 exhorting the Government of India to review it "in the best interests of the people of the state." The treaty has also been lambasted in India on the grounds that India signed it without an assessment of the future availability of water in the Indus system.

Recommendations: Towards Integrated Basin Management

The Indus (and its tributaries) is the lifeline of Pakistan and the effects of environmental change are being felt on both sides of the border. Instead of revising the treaty and wrestling over riparian politics, India and Pakistan could work towards integrated basin management as water security is emerging as a critical issue in both countries. Water management negotiations are the biggest confidence-building measure between the two countries.

At the same time, vituperative sentiments generated by certain sections of the Pakistani establishment need to be kept in check. Pakistan has time and again reiterated that the IWT is inequitable in nature and blamed India for water problems on Pakistan's soil. The facts state otherwise. The Pakistan Army's rhetoric against India that has always jeopardized the country's relations with India (the upper riparian) in the past might have lowered but the militant networks operating in Pakistan are now adding fire to fuel. For example, Hafiz Sayeed, allegedly involved in the 2008 Mumbai terror attack openly accused India of 'water terrorism'.

Finally, the Indus Water Treaty needs to be amended to take environmental change into consideration; the focus needs to shift to Article VII that is entitled "Future Cooperation" that emphasizes setting up of new hydrological and meteorological observation stations and implementing engineering works including drainage ones. Moreover, groundwater extraction close to the border areas of both countries is overlooked by the IWT (focusing on surface water recharge), an area in which India and Pakistan could cooperate.

The IWT should not be treated as 'division' of waters as was the case during the Partition in 1947, when land was divided between the two countries. Water is an existential issue and both countries need to go beyond politics to cooperate on river water sharing.

Military "Propaganda" in its Current Form

Matthew Wallin

4 February, 2013

This weekend, USA Today indicated that outgoing Defense Secretary Leon Panetta expressed skepticism at the effectiveness of the Pentagon's "propaganda" programs.

To an extent, Panetta is right: it is incredibly difficult to gauge the effectiveness of modern "propaganda." This makes perfect sense, especially if the communication campaigns comprising that "propaganda" aren't particularly well-suited for the target audience.

According to the article, Michael Zenko of the Council on Foreign Relations said:

The Pentagon has an obligation to the American people, and the world, to provide information and tell its story — if nothing else to counter myths and misinformation. But it should only do so in an open and transparent way. Using third-party contractors to shape public opinion is dishonest and unethical.

For the most part, Zenko is correct that the Pentagon has a certain obligation to counter myths and misinformation that negatively impact its mission effectiveness. As he also points out, transparency and honesty are crucial in assisting the Pentagon in meeting this obligation. With regards to truth and propaganda, Edward R. Murrow's classic quote explains it best:

American traditions and the American ethic require us to be truthful, but the most important reason is that truth is the best propaganda and lies are the worst. To be persuasive we must be believable; to be believable we must be credible; to be credible we must be truthful. It is as simple as that.

Yet where Zenko's statement seems less accurate is in the use of contractors. Whether one employs third-party contractors to design communication campaigns isn't the issue. The issue is whether those contractors are actual communication professionals who can present truthful information in a way that both resonates with the target audience and assists in achieving mission goals. Questioning the premise of using third party contractors obfuscates the questions of message effectiveness and whether Pentagon actually possesses well-trained staff that can develop these types of effective communication strategies. This is unclear.

In military information operations (IO), it is critical to understand the mission's objectives. Is the IO campaign designed to have a tactical or strategic effect? Is it aiming for long-term or short-term results? Is the target audience foreign military members, an insurgent group, the general population, or another element? What types of mediums does the target audience use? Is the target audience literate? Will the selected imagery (if any) resonate with that audience? Do we understand the audience's culture, customs, and norms? Just because something is familiar to Americans, doesn't mean it will be understood by the target audience.

IO planners must be cognizant of the spectrum of reality and perception, and how any potential IO campaign fits into the picture. If an IO campaign is actively trying to alter perceptions of an issue in which the target audience's experiences in reality contradict the perception we desire, there is a significant chance that attempts to alter this perception without addressing the reality will reduce the messenger's credibility. Of course, this also negatively affects the ability to influence audience perceptions when those perceptions are not reflective of reality.

In Afghanistan, IO efforts appear to have had mixed effects, likely resulting in some of Secretary Panetta's skepticism. The use of leaflets, posters and imagery in areas with high illiteracy and little visual or print media rendered the use of such tactics questionable at best. Since many IO campaigns were ill-suited for the

environment and the audience, it is no wonder that the effectiveness of such campaigns as a whole has been called into question.

If efforts to influence the target audiences in areas of military or political conflict are being viewed by policy makers solely as propaganda efforts, that may be where part of the problem lies. If the strategic or tactical goal is not clearly defined, that certainly can have an effect on the effectiveness of IO as well. What policy makers and the military should do is clearly define their goals, and employ professionals who can determine ways in which communication can be used to increase influence towards accomplishing those goals. As a nation, we must understand that information operations, propaganda, or public diplomacy—whatever we choose to call it—is far from a silver bullet, and should not be measured with a rubric of absolutism. It can be, however, a scope that helps present a clearer picture of what it is we are trying to do and how we can do it better.

Defense industry faces big tests with Washington and Wall Street

August Cole

26 April, 2013

The latest quarterly financial results this week offer yet another sign that the U.S. defense industry is in the midst of a critical phase.

The biggest U.S. contractors reported no first-quarter sales growth compared with the year-ago period. Raytheon's revenue dipped by about 1%. Boeing's defense business also saw a similar slip. Lockheed Martin's sales inched marginally lower too, as did Northrop Grumman's revenue. General Dynamics reported about a 2% decline.

Meanwhile, cost cutting is propping up the industry's first-quarter profits, but only just so. There is only so much corporate flab bean counters can burn off before doing long-term damage.

The effect of sequestration still has not shown up in force. It's too soon, for one. In one case, Lockheed Martin said this week it expects 2013 revenue to be reduced by $825 million because of the across the board automatic budget cuts that only went into effect last month.

All this comes as the industry's influence in Washington has waned. The politics of weapons spending is no longer as predictable, or malleable, as it once was. Last year's failed campaign by the industry to stave off sequestration is one such example where lobbying muscle and political threats were not enough.

Not only is the strength of the U.S. military potentially on the line, but America's competitive position depends on the industry successfully weathering this period.

The defense industrial base is an important element

of America's economic, and strategic, edge, whether through the contribution to the U.S. economy of billions of dollars in aerospace exports or the employment of some of the country's most public-minded engineers and programmers.

See the American Security Project paper on American competitiveness and the defense industrial base.

The challenge for the Defense Department, executives and lawmakers is what to do next. The industry needs to redefine what it can offer Washington and Wall Street after becoming accustomed to delighting shareholders and winning appropriations battles inside the Beltway.

The latest quarterly results underscore that this is one of the most important tests for

the industry's executives this year. Managing in a cyclical industry during down times when uncertainty is the norm is a true measure of corporate leadership.

The stakes are greater than any one company

Check out ASP's Blogs on American Competitiveness here, and click below to access our White paper that discusses these issues further:

American Competitiveness - Defense Industrial Base by The American Security Project

Egypt: Past, Present, and the Future – A Conversation with Dr. Mona Makram-Ebeid

Farhad Mirzadeh

2 December, 2013

The American Security Project (ASP) hosted an event titled "Egypt: Past, Present, and the Future." The featured speaker at the event was Dr. Mona Makram-Ebeid, a former Member of the Egyptian Senate.

Egypt has been at the forefront of many discussions over the last few years as it has seen popular upheaval against perceived injustices. Protestors took to the streets and toppled a leader to usher in an era of democracy. However, the power vacuum after Mubarak left office left the country scrambling. The parliament was dissolved, new elections were held making Muhammad Mursi and the Muslim Brotherhood big winners.

The hopes of a secular and democratic Egypt began to fade with the election which prompted another protest against Morsi. This time, Morsi was ousted with the help of the military and Adly Mansour is made the interim President. There is still hope that the government adopts a Constitution that gives more power to the people and protects minority rights of those in Egypt.

At the event, Dr. Makram-Ebeid spoke about the prospects of democracy in Egypt, and what the current struggles mean for democracy in the country. She highlights the need for politics to dispense of radical ideologies and accept a modern, egalitarian stance toward running the country. This would best achieve democracy and protect the Christian minorities that are being targeted by political groups, including the Muslim Brotherhood.

She also touched upon the subject of terrorism in the Sinai Peninsula, the military and strategic relationship between Egypt and the United States, and women in politics.

You can listen to the event below:

Oil Dependency: a Subtle but Serious Threat

William Joyce

4 June, 2013

Weapons of mass destruction, terrorism, and cyber crime are in the headlines as significant threats to our national security. However, over the next twenty to thirty years, America's overwhelming dependence on oil presents subtler, although no less serious, threats to national security.

The U.S. is the largest consumer of oil in the world, burning through 18.83 million barrels per day. Even if the U.S. produced all petroleum products domestically, Americans would still feel the shocks from market volatility. Oil is a global market, and market prices prevail regardless of origin. Despite policies to improve vehicle efficiency, America remains dependent on oil. This dependency presents several threats to U.S. national security.

First, oil price volatility hampers American productivity and consumers. Economic vitality requires stable prices, as spikes in oil prices may reduce output and wages while increasing inflation and interest rates. Most commonly, consumers feel these disruptions at the gas pump. The transportation sector alone consumes 13.223 million barrels of petroleum per day. Petroleum facilitates the functioning of these critical transportation networks, and small disruptions may lead to cascading price dumps. As volatile oil prices destabilize the economy, they jeopardize U.S. interests and national security.

Secondly, U.S. oil dependency distorts foreign policy. The U.S. imported 40% of its petroleum products in 2012. In order to ensure foreign oil security, the U.S. supports regimes it might not otherwise. Many oil-rich Islamist regimes in the Middle East receive de facto support from America in return for producing

stable oil, despite conflicting ideologies and interests. Similarly, estimates show that extended military operations to guard oil supply lines cost the U.S. military $67.5-$83 billion per year. This dependency is costly and conflicts with the national security agenda.

Lastly, oil dependency undermines military preparedness and effectiveness. The Department of Defense consumed 117 million barrels of oil in 2011 in order to fuel the military's vehicles, ships, and planes. The military must complete its missions, and without fuel options, it must endure oil price fluctuations. For every 25-cent increase per barrel of oil, the Department of Defense pays an additional $1 billion in fuel costs per year. Additional fuel costs means the military has to cut costs elsewhere, which have negative impacts on security and military preparedness.

Military energy security requires reduced consumption of petroleum products, yet the Department of Defense depends on oil for 80% of its energy needs. The military may reduce consumption by reforming energy-intensive activities, optimizing energy usage, and developing innovative technologies to reduce energy waste, but sequestration budget cuts will slash future investment.

Instead of focusing solely on drilling for more oil, the U.S. must pursue a two-pronged approach that focuses on reducing oil demand while at the same time makes investments in developing alternative fuels. Clean energy technologies could cut imports by 44% which is nearly eight times more than potential domestic drilling production.

Greater efforts to improve vehicle efficiency through corporate average fuel economy standards (CAFE), congestion charges, or fuel taxes can contribute to reducing oil consumption.

Moreover, America's oil dependence saps the U.S. economy because consumers lack fuel options. To that end, investments in alternative sources of fuel – biofuels, natural gas, electric vehicles - can act as a hedge against oil price volatility. Throughout 2012, the U.S. spent $4.36 billion on energy research, which fell well below IEA recommendations. Due to budget caps and sequestration, energy research funding will drop substantially over the next few years.

Oil dependency is a long-term threat. The rising cost of oil dependence affects all aspects of American society and threatens national security. If the U.S. wishes to reduce these threats in the future, the U.S. must properly fund energy research and development to commercialize technologies that will break America's oil dependency.

Only then can we say we have actually achieved energy security.

Fusion Makes Great Progress

Farhad Mirzadeh

8 October, 2013

Fusion research is making great strides now, coming closer to the promise of providing clean, cheap and plentiful energy.

Scientists and researchers at the National Ignition Facility (NIF) recently passed a **crucial milestone**: outputting more energy than what was absorbed by the fuel. The recent experiment included all 192 lasers at the NIF being targeted to produce a record yield in output. This was seen as a hurdle to achieving the main goal of fusion research: ignition, when reactions generate as much energy as the laser supplies. The reason for this is because there are inefficiencies in different parts of the system.

The NIF is one of several large research projects concerning fusion energy. ITER is another one that many developed nations have been working together on. However, **it is different than the laboratory at NIF** in that it uses magnetic confinement to contain the hot fusion fuel.

Since 2009, NIF officials sought to have something demonstrable by the end of September 2012. But technical problems prevented that goal from being reached. As a result, the focus of the lab shifted to nuclear weapons, an original part of the lab's mission.

The recent breakthrough comes at the onset of large developments in the broader field of fusion research. **Edward Moses**, the principal associate director for the National Ignition Facility & Photon Science, has taken a new position to explore commercial applications of fusion energy. He is long considered to be a world leader on fusion energy. With the recent breakthrough, it is likely that there is going to be more emphasis on research and commercial applications of fusion energy.

The American Security Project (ASP) believes that there is large potential for breakthrough in fusion research within the next decade that can lead to commercial applications. In its report "**Fusion Power – A 10 Year Plan to Energy Security**," the ASP discusses how to emphasize fusion energy research. Furthermore, it discusses the potential that fusion energy can have on American competitiveness and national security as it is able to curb the effects of climate change.

Check out more:

Inertial Confinement Fusion at the National Ignition Facility

WHITE PAPER: Fusion Power – A 10 Year Plan to Energy Security

International Progress on Fusion Energy – How American Leadership is Slipping

Fusion Fact Sheet

Event Review - Restoring American Competitiveness: A National Security Crisis

Justin Winikoff

11 July, 2013

Last November, ASP released a white paper outlining how America's competitiveness is essential to its national security. A few months later in February, Dr. Michael Porter and Dr. Jan Rivkin of the Harvard Business School released an unrelated report with results and analysis of a survey of over 7,000 business leaders on American competitiveness. Although the two studies were done independently, they reach strikingly similar conclusions: American competitiveness is slipping, and this requires urgent attention.

Our slipping competitiveness was the subject of ASP's panel discussion (in collaboration with the HBS Club of Washington, D.C.) on Wednesday entitled, "Restoring American Competitiveness: A National Security Crisis."

The panel featured Dr. Porter and Dr. Rivkin, as well as Dante Disparte of the HBS Club of D.C., and ASP board members Norman Augustine and Lieutenant General John Castellaw, USMC (Ret.). The discussion was moderated by ASP CEO Brigadier General Stephen A. Cheney, USMC (Ret).

Although the experts come from varying backgrounds, from military experience to academia, their analyses of American competitiveness echoed analogous concerns.

First of all, the panel discussed how competiveness must be defined.

It cannot only be measured by the success of domestic businesses in the global market, but also by the quality of life for American citizens. Mr. Augustine explained that "competitiveness is an acronym for jobs," an idea additionally espoused by Dr. Porter and Mr. Disparte. Dr. Porter emphasized that the jobs are affected are those filled by semi-skilled, middle class workers. The high-skilled workers, he noted "are going to be fine."

The panel additionally emphasized the fact that America's slipping competitiveness is "not just a hangover from the Great Recession," as Dr. Rivkin explained. Instead, our global position is indicative of a structural challenge within the United States.

The problem lies in the depletion of America's once-rich "commons," according to Dr. Rivkin. The "commons" encompasses our crumbling infrastructure, our limiting high-skilled immigration, and our corporate tax policy, which he called "the worst of all worlds."

Norman Augustine offered a national security perspective on the importance of American competitiveness. He outlined three ways in which diminishing competitiveness hurts our national security. First, if our economy is weak, then we cannot afford a strong military. It also means that we have no clout in the geopolitical world. Finally, if we do not remain competitive, our quality of life will decline. Mr. Augustine recommended we improve the American education system by finding "teachers who are qualified to teach" and increase investment in basic research.

Lt. General Castellaw stressed that "it's certainly not military power alone" that determines American security. Unfortunately, American veterans, he added, are not coming home to the jobs they deserve to keep rural communities competitive. The lieutenant general emphasized that we must revitalize our small businesses and middle class jobs to "strengthen the fiber" of the United States. His recommendations to restore American competitiveness included a balanced, practical energy policy and an integrated policy approach that includes all components of American power: our military might, economic strength, and foreign diplomacy.

Mr. Dante Disparte asserted that improving American competitiveness does not have to be a zero-sum

game. Our success does not have to come at the expense of other nations, but is instead an "all ships rising proposition." He echoed the other experts' keys to re-establish American competitiveness, with a particular emphasis fixing our corporate tax policy by repatriating income that multinationals are currently holding abroad.

Dr. Michael Porter concluded by accentuating that competitiveness is really about middle class jobs.

The corporations and high-skilled workers will remain competitive. It is those in the middle for whom policymakers and business leaders must act. Dr. Porter noted that it is nearly universally agreed that American competitiveness is slipping. What needs to get done is also not too controversial.

The "fundamental question," Dr. Porter posed, is "how do we get things done?"

Although the current political climate makes progress challenging, the competitiveness expert is beginning to see hope.

America's dropping global leadership is too imperative of an issue to be ignored.

American competitiveness is not only an obstacle for business, but also a threat to our national security.

With support from both business leaders and security experts, hopefully Washington can begin acting to restore American competitiveness.

To **listen** to the event, click below.

The China Question

August Cole

March 28, 2013

One of the best benefits of learning a new language is you begin to understand your own a lot better.

With that in mind, it is worth looking at China for an important window into how a country that some expect will become the world's largest economy in a few years is wrestling with a political system and a leadership class struggling to stay connected to the nation's wider population.

For example, lavish personal spending by officials, fueled by a cocktail of bribes and the state's coffers, is no longer being tolerated. The New York Times found that everything from an official's choice of wristwatch to the menus at bureaucrat haunts are being toned down at the behest of President Xi Jinping. Austerity has its own flavor in China.

The wielding of power in a functional political system during times of political and economic transition is critical to a nation's competitiveness. Corruption, self-dealing and factionalism are liabilities that undermine any country seeking a leading role on the global stage. That is true in the private sector just as it is in government. When both realms are riddled with such flaws a country's leaders are effectively selling their future to buy advantages today. Just as America wants to improve its own competitive position, other nations such as China are doing the same.

Xi's recent arrival in the country's top post comes at a pivotal moment. Its economic rise may become choppier but the sheer momentum of the Chinese economy, and a shift from exports toward domestic consumers for growth, potentially means big shifts in the global pecking order right around the time of the next U.S. presidential election. The Organi-

zation for Economic Cooperation and Development expects China to become the world's biggest economy in 2016, according to its latest China survey released earlier this month.

This internal focus on yanking the reins of top Chinese officials comes at a time of expansion abroad. In a sense, Xi is putting modern China's house in order as the country prepares to extend itself into the Pacific farther than it has before. The latest, according to Voice of America, involves sending a small number of Chinese naval vessels into the South China Sea, near Malaysia.

Such adventures have meaning regionally for China, but also for the U.S. given its "pivot" from the Middle East and Central Asia to the Pacific. How the U.S. and China manage their own political systems, and the attendant liabilities that go with them, will play a major role in how each nation executes its strategy in the Pacific. That is something both countries already understand.

Check out our other blogs on the subject here.

Sarin Manufacturing by Non-State Actors: A Possible Security Nightmare

Chris Smith

6 June, 2013

Earlier this week in a post in Flashpoints Blog I argued while chemical weapons are a major national security concern, the possible manufacturing of sarin by non-state actors should be given special consideration. The manufacturing of sarin represents a unique threat because the relative ease of its synthesis and access to those chemicals needed for its synthesis; as such it is prudent to examine what treaties/regulations currently exist to hinder its manufacture and their failings.

Sarin is a binary compound that's manufacture involves the simple mixing of two chemicals (methylphosphonyl difluoride and isopropyl alcohol). The reaction is very rapid and efficient though impurities will lead to a relatively short shelf life of weeks. Because of this, many weapons systems that deploy sarin actually mix these chemicals immediately prior to use, in some cases while in flight.

Methylphosphonyl difluoride used in the synthesis of sarin is classified as a Schedule 1 substance under the 1993 Chemical Weapons Convention, and therefore highly regulated and restricted; internationally there is considered no valid reason for a signatory of the Convention to possess it. Methylphosphonyl difluoride is the key to sarin manufacture as other chemicals involved are too readily available to be regulated.

Chemicals that could be used to produce sarin through a series of two or more steps, by producing methylphosphonyl difluoride as an intermediate, are covered under the Convention's Schedule 2, though they can still be obtained within signatory states and exported.

The international community has taken steps in the past to make sure that such chemicals, even in small quantities, do not fall into the hands of rogue state actors, realizing the ease with which they could be converted to chemical weapons. However, the potential of non-state actors gaining access to relatively large quantities of these chemicals is quite real.

While there will always be the possibility of industrial chemicals being used maliciously, there is much more that the US government and the international community can do.

The current monitoring requirements under the Chemical Weapons Convention in the US for chemicals that could be used to synthesize sarin through two or more steps are surprisingly lacking. Facilities that produce or purchase such Schedule 2 chemicals are not required to report the chemicals in cases where quantities do not exceed "1 metric ton"!

Other US monitoring requirements leave much to be desired. One chemical that can be used to synthesize methylphosphonyl difluoride is monitored by the Department of Homeland Security (DHS), methylphosphonothioic dichloride, through its list of interested chemicals. However, many others are not including a much more readily convertible chemical, methylphosphonyl dichloride, which falls under Environmental Protection Agency supervision regarding the reporting of hazardous quantities in excess of 100 pounds.

Sarin's lethality cannot be understated. One and a half grams of vaporized sarin will incapacitate and kill most individuals in a confined environment, (assumed to be 200 cubic meters), in roughly a minute. 100 pounds of methylphosphonyl dichloride, even with only a 10% synthetic yield of sarin through a two step process would produce enough sarin to carry out almost 3,200 such attacks.

Both at home and abroad, access to the precursors of methylphosphonyl difluoride should be limited and/or have their monitoring requirements greatly increased. The availability of precursor chemicals like methylphosphonic dichloride that can readily be bought on chemical web sites should be of great concern to lawmakers in the US and around the world.

American law makers or the appropriate regulatory agencies should consider greater scrutiny of chemicals like methylphosphonic dichloride that can easily be used to create chemical weapons, perhaps by considering increases to DHS's list of chemicals of interest and changing monitoring thresholds. The international community should consider augmenting the list of precursor chemicals covered by the Chemical Weapons Convention by greatly increasing the monitoring requirements of chemicals covered under Schedule 2.

Christopher Smith is a PhD student at the University of Arizona's Department of Chemistry and Biochemistry with a focus on Analytical Chemistry.

AMERICAN SECURITY PROJECT

BOARD OF DIRECTORS

The Honorable Gary Hart, Chairman

Senator Hart served the State of Colorado in the U.S. Senate and was a member of the Committee on Armed Services during his tenure.

Norman R. Augustine

Mr. Augustine was Chairman and Principal Officer of the American Red Cross for nine years and Chairman of the Council of the National Academy of Engineering.

The Hon. Donald Beyer

The Hon. Donald Beyer is the former United States Ambassador to to Switzerland and Liechtenstein, as well as a former Lieutenant Governor and President of the Senate of Virginia.

Lieutenant General John Castellaw, USMC (Ret.)

John Castellaw is President of the Crockett Policy Institute (CPI), a non-partisan policy and research organization headquartered in Tennessee.

Brigadier General Stephen A. Cheney, USMC (Ret.)

Brigadier General Cheney is the Chief Executive Officer of ASP.

Lieutenant General Daniel Christman, USA (Ret.)

Lieutenant General Christman is Senior Vice President for International Affairs at the United States Chamber of Commerce.

Robert B. Crowe

Robert B. Crowe is a Partner of Nelson Mullins Riley & Scarborough in its Boston and Washington, DC offices. He is co-chair of the firm's Government Relations practice.

Lee Cullum

Lee Cullum, at one time a commentator on the PBS NewsHour and "All Things Considered" on NPR, currently contributes to the Dallas Morning News and hosts "CEO."

Nelson W. Cunningham

Nelson Cunningham is President of McLarty Associates.

Admiral William Fallon, USN (Ret.)

Admiral Fallon has led U.S. and Allied forces and played a leadership role in military and diplomatic matters at the highest levels of the U.S. government.

Raj Fernando

Raj Fernando is CEO and founder of Chopper Trading, a technology based trading firm headquartered in Chicago.

Vice Admiral Lee Gunn, USN (Ret.)

Vice Admiral Gunn is the President of the Institute of Public Research at the CNA Corporation, a non-profit corporation in Virginia.

Lieutenant General Claudia Kennedy, USA (Ret.)

Lieutenant General Kennedy was the first woman to achieve the rank of three-star general in the United States Army.

General Lester L. Lyles, USAF (Ret.)

General Lyles retired from the United States Air Force after a distinguished 35 year career. He is presently Chairman of USAA, a member of the Defense Science Board, and a member of the President's Intelligence Advisory Board.

Dennis Mehiel

Dennis Mehiel is the Principal Shareholder and Chairman of U.S. Corrugated, Inc.

Stuart Piltch

Stuart Piltch is the Co-Founder and Managing Director of Cambridge Advisory Group, an actuarial and benefits consulting firm based in Philadelphia.

Ed Reilly

Edward Reilly is CEO of Americas of FD International Limited, a leading global communications consultancy that is part of FTI Consulting, Inc.

Governor Christine Todd Whitman

Christine Todd Whitman is the President of the Whitman Strategy Group, a consulting firm that specializes in energy and environmental issues.

The American Security Project (ASP) is a nonpartisan organization created to educate the American public and the world about the changing nature of national security in the 21st Century.

Gone are the days when a nation's security could be measured by bombers and battleships. Security in this new era requires harnessing all of America's strengths: the force of our diplomacy; the might of our military; the vigor and competitiveness of our economy; and the power of our ideals.

We believe that America must lead in the pursuit of our common goals and shared security. We must confront international challenges with our partners and with all the tools at our disposal and address emerging problems before they become security crises. And to do this we must forge a bipartisan consensus here at home.

ASP brings together prominent American business leaders, former members of Congress, retired military flag officers, and prominent former government officials. ASP conducts research on a broad range of issues and engages and empowers the American public by taking its findings directly to them via events, traditional & new media, meetings, and publications.

We live in a time when the threats to our security are as complex and diverse as terrorism, nuclear proliferation, climate change, energy challenges, and our economic wellbeing. Partisan bickering and age old solutions simply won't solve our problems. America – and the world - needs an honest dialogue about security that is as robust as it is realistic.

ASP exists to promote that dialogue, to forge that consensus, and to spur constructive action so that America meets the challenges to its security while seizing the opportunities that abound.

ASP

American Security Project

www.americansecurityproject.org