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An Examination of the Pentagon's Prompt Global Strike Program: Rationale, Implementation, and Risks

by Vince Manzo, CDI Research Assistant

Introduction

The Prompt Global Strike (PGS) program aims to enable the United States to plan and deliver military strikes anywhere on the globe in less than one hour. The rationale for the PGS mission is that new capabilities are required to effectively respond to new threats. The Department of Defense (DOD) initially sought to achieve a PGS capability by placing conventional warheads on Trident missiles; however, Congress refused to fund the weapons system due to concerns that other countries would be unable to distinguish between conventional and nuclear Trident missiles. A recent report by the Government Accountability Office (GAO) concluded that DOD's studies of potential PGS weapon systems did not include comprehensive assessments of the enabling capabilities that are necessary for a PGS weapon to function effectively. For instance, DOD does not incorporate intelligence-gathering capabilities into its studies, which is especially disconcerting given that military officials have described the ability to rapidly gather, integrate and analyze intelligence as a critical component of the PGS concept.

In light of these risks and potential operational complications, it is worth questioning the rationale of the PGS program. The Pentagon has not demonstrated why strategically deployed forward operating bases do not provide sufficient rapid strike capabilities against rogue states and terrorists armed with weapons of mass destruction (WMDs), the two most frequently cited justifications for a PGS capability. Similarly, if the United States possesses the rapid and precise intelligence gathering capability necessary to execute a PGS, this capability by itself may create alternative options that obviate the need for a rapid military strike. In addition to questions about the primary rationale for PGS, the question of whether or not the United States will ever possess the commensurate intelligence capabilities to execute a PGS casts doubt on the feasibility of the PGS concept.

Nevertheless, interest in PGS capability within the Pentagon and in Congress remains strong. The Fiscal Year 2009 (FY 09) House and Senate defense authorization bills recommend additional funding for DOD efforts to achieve a PGS capability with hypersonic vehicle technology. Since PGS can be implemented in many different ways, it gives DOD a broad mandate to pursue a variety of new weapon systems. As this report demonstrates, the Pentagon may not closely examine the political and strategic

implications of every weapon system it explores; it may also fail to develop the commensurate enabling capabilities that are necessary for these systems to execute a PGS. Therefore, it is imperative that Congress exercise strict oversight over all aspects of any PGS program. For starters, Congress should make further funding of PGS weapons system studies contingent upon their verifiable inclusion of enabling capabilities.

The Rationale for a Prompt Global Strike Capability

The U.S. PGS program aims to provide the president with the ability to plan and deliver limited duration and extended range strikes anywhere on the globe in less than one hour. The 2001 Nuclear Posture Review (NPR) formally introduced the global strike concept as part of a new triad that integrates conventional and nuclear force options into an offensive strike capability suited for the 21st century: “To meet the nation’s defense goals in the 21st century, the first leg of the New Triad, the offensive strike leg, will go beyond the Cold War Triad...with non-nuclear strategic capabilities that strengthen the credibility of our offensive deterrence.”¹ Gen. James Cartwright of the Marines, the former commander of U.S. Strategic Command (STRATCOM), argued in a 2006 congressional hearing that a PGS capability is necessary because “it is unlikely that we will have forces in every place we need them at the crucial moment when we have an opportunity to stop a WMD-armed threat far from our shores.”² Based on this justification, two critical assumptions underlying PGS are that elusive threats to U.S. national security can emerge and that the United States must possess the capability to strike rapidly without relying on existing forward bases. Therefore, the rationale for the PGS mission is that new capabilities are required to effectively respond to new threats.

Consistent with this argument, a PGS capability has also been discussed as an integral component of “tailored deterrence.” Tailored deterrence envisions integrating nuclear, conventional and non-kinetic capabilities into a single menu of options from which decision-makers can draw from to formulate an appropriate strike plan for a given set of targets and objectives. The logic underlying tailored deterrence is that “deterrence threats based on the generally high nuclear yield of the Cold War arsenal may not appear credible”³ against threats that fall short of a large scale nuclear attack on the United States. Therefore, the United States must fashion tempered force options that are commensurate with the dangers facing it in the contemporary security environment. For instance, the 2006 Quadrennial Defense Review (QDR), one of the key documents defining “tailored deterrence,” lists advanced military competitors, regional WMD states, and non-state terrorist networks as threats that require “more tailored approaches” than the strategic nuclear deterrence that formed the cornerstone of U.S. security policy during the Cold War.⁴

The PGS mission would contribute to tailored deterrence, its advocates argue, by giving the United States the ability to wield conventional weapons that possess the target-impact speed and global reach of long-range nuclear ballistic missiles, thereby creating a more adaptable deterrent. As described by a DOD spokesman: “The goal of this new strategy is to produce a force capable of assuring allies, dissuading competitors, deterring adversaries, and if necessary defeating enemies...The conventional missile program will

help achieve this goal by producing the capability to defeat threats on short notice without crossing the nuclear threshold.”⁵ Cartwright elaborated on this point, stating that “trying to bring all those pieces together to what will become deterrence, those things that will keep our adversaries at bay whether they are nation states, like the former Soviet Union was, or whether they are as simple as a terrorist, and trying to keep a terrorist to coming to our soil, that is what Global Strike and Space is at the heart of.”⁶

However, some military officials also believe PGS will enable the United States to mitigate existing constraints on its ability to carry out military objectives. Cartwright, in an interview with *Arms Control Today*, discussed the PGS mission in the context of the U.S. air strikes against Libya in 1986. While recalling that the strikes were delayed due to disputes about overflight rights and that the military lost an F-111 fighter bomber to Libyan defenses, Cartwright stated that a PGS capability could have eliminated both mission complications: “[What] if you could influence in a way that was quickly responsive and precise, while doing a much better job of collateral damage, and not having to expose crews and aircraft to defensive measures?”⁷ The implication of Cartwright’s rhetorical question is that the United States would face fewer constraints when considering, planning and applying military force to achieve its objectives. Therefore, although the PGS’s principal rationale may be the need to adapt to new threats, a PGS capability is also attractive to DOD because of its utility in contingencies that are not unique to the post-Cold War environment. As discussed in a later section of this report, this premise is debatable. Some analysts argue that a PGS capability entails strategic, political and operational safety risks, all of which could make policymakers reluctant to employ a PGS option.

Creating a Prompt Global Strike Option

In January 2003, President George W. Bush took the first steps to transform PGS from a concept into an operational capability by assigning STRATCOM the responsibility of “providing integrated global strike planning and command and control support to deliver rapid, extended range, precision kinetic (nuclear and conventional) and non kinetic (elements of space and information operations) effects in support of theater and national objectives.”⁸ STRATCOM also has responsibility for integrating the capabilities of combatant commanders for global strike missions and, in a crisis situation, will take the lead in developing and planning courses of action for the president and the secretary of defense.⁹ In 2005, STRATCOM established the Joint Functional Command for Space and Global Strike, which was reorganized in August 2006 and is currently listed on the STRATCOM website as the Joint Functional Command for Global Strike and Integration (JFCC GSI). The JFCC GSI is responsible for command and control of global strike capabilities and integrating global strike into theater operations.¹⁰

In addition to STRATCOM, PGS activities are distributed between two organizations within the Office of the Secretary of Defense and the Joint Staff. The Office of the Undersecretary of Defense for Policy is tasked with formulating policy and guidance for PGS and preparing DOD’s congressionally mandated annual report on PGS to Congress. The Office of the Undersecretary of Defense for Acquisition, Technology and Logistics

provides oversight of the development and deployment of global strike capabilities.¹¹ As discussed below, the 2008 Defense Appropriation Act placed primary budgetary authority over Navy and Air Force PGS capability developmental programs in this office. The Joint Staff oversees the integration of PGS into joint doctrine and provides support for joint exercises of the combatant commands.¹²

Conceptual Confusion Among Key PGS Stakeholders

A recent report by GAO concluded that DOD’s implementation of the PGS mission suffers from conceptual ambiguity among the key shareholders. Particularly, it noted that “key stakeholders, particularly the geographic combatant commanders, have different interpretations of the scope, range and potential use of capabilities needed to implement global strike and under what conditions global strike would be used in military operations.”¹³ GAO noted that without “a complete and clearly articulated concept that is communicated and well practiced with key stakeholders, DOD could encounter difficulties in fully implementing its concept and building the relationships necessary to carry out global strike operations.”¹⁴

GAO concluded that the different interpretations of PGS within the service branches stem from DOD’s use of several definitions of the concept. GAO reported that a number of officials within DOD do not believe that these definitions “provide a clear and consistent definition of global strike.”¹⁵ GAO used the following table to illustrate some of the definitions DOD uses to describe PGS:

Table 1: Examples of Definitions Used by DOD to Describe Global Strike

Definition of global strike	Document
“...the capability for accelerated planning and execution using the full range of kinetic and non-kinetic effects, special operations force capabilities in support of national or theater commanders’ objectives.”	<i>Report to Congress: Global Strike Plan</i> , The Office of the Secretary of Defense, June 2004
“...responsive joint operations that strike enemy high value/payoff targets, as an integral part of joint force operations conducted to gain and maintain battlespace access, achieve other desired effects and set conditions to achieve strategic and operational objectives.”	<i>Global Strike Joint Integrating Concept</i> , Department of Defense, January 2005
“...the ability to rapidly plan and deliver limited-duration and extended-range attacks to achieve precision effects against highly valued adversary assets.”	<i>Deterrence Operations Joint Operating Concept</i> , Department of Defense, July 2006
“The capability to rapidly attack fleeting or emerging high-value targets without warning, anywhere on the globe to meet national objectives. Global strike is also	<i>Air Force Concepts of Operations</i> , Department of the

the capability to neutralize the adversary's anti-access systems, paving the way for follow-on forces." Air Force, December 27, 2006

"...as rapidly planned, limited-duration, extended-range precision attacks that are conducted to achieve strategic objectives. They may be executed against highly valued adversary assets using lethal and nonlethal methods." *Homeland Security, Joint Publication 3-26*, August 1, 2005, and *Homeland Defense, Joint Publication 3-27*, July 12, 2007, Joint Chiefs of Staff

- Government Accountability Office (GAO), "Military Transformation: DOD Needs to Strengthen Implementation of its Global Strike Concept and Provide a Comprehensive Investment Approach for Acquiring Needed Capabilities." GAO-08-325, <http://www.gao.gov/new.items/d08325.pdf> April 30, 2008, p. 14.

In addition to these varying definitions, GAO cited other factors that contribute to the conceptual confusion surrounding PGS: it has not been widely incorporated into joint doctrine, it suffers from STRATCOM's failure to effectively promote a common understanding of PGS operations, and it has not been widely practiced in training. GAO recommended that the Pentagon take action to improve its performance in each of these areas. DOD concurred with GAO's conclusions. However, GAO and DOD disagree about the appropriate phase in the developmental process at which to incorporate PGS into joint doctrine. DOD argues that PGS is not yet executable, and therefore not mature enough to merit incorporation. But GAO maintains that DOD should take immediate steps to facilitate the development of joint doctrine, such as setting a time for "completing development and reaching approval of its global strike concept and definition and incorporating the approved concept and definition in department documents."¹⁶

Enabling Capabilities of PGS

DOD has identified 1) intelligence collection and dissemination 2) surveillance and reconnaissance 3) command, control, and communications (C3) and 4) battlefield assessment as the enabling capabilities that are necessary to effectively employ a PGS weapons system in support of theater and strategic objectives.¹⁷ A 2004 Defense Science Board (DSB) Report on Future Strategic Strike Forces concluded that current "enabling capabilities are not sufficient to fully support the requirements of global strike operations."¹⁸ Given that DOD itself has identified the importance of enabling capabilities for PGS, it is quite disconcerting that four years later the GAO report concluded that: "DOD studies to identify potential offensive strike systems...do not collectively provide a complete assessment of enabling capabilities needed to support global strike operations."¹⁹ This conclusion applies to separate studies being carried out by STRATCOM, the Air Force, Air Force Space Command, the Joint Staff and the Navy, indicating that inadequate focus on enabling capabilities is a systemic problem. To be fair, GAO noted that several of the studies examine enabling capabilities, but on too limited of a scale. For example, GAO also noted the two teams conducting the Air Force PGS Analysis of Alternatives have thus far simply assumed that "certain needed

improvements in enabling capabilities...would be available when any future system is fielded.”²⁰

The failure to include comprehensive assessments of enabling capabilities in PGS weapons development studies is problematic for two reasons. First, DOD may spend billions of dollars on PGS only to have it rendered impotent because STRATCOM lacks the intelligence and C3 capabilities to utilize its main advantages: target-impact speed and global reach. Secondly, if DOD incorporates a functional PGS weapon system into joint doctrine but neglects to develop the commensurate enabling capabilities, U.S. authorities may believe that they have a capability that does not actually exist. Such a situation would leave the United States more vulnerable in certain situations. For example, in the event of an imminent attack against the United States, senior decision-makers may adopt a response that hinges on a PGS that is unlikely to achieve its desired effect. Additionally, executing a PGS without sufficient intelligence or C3 capabilities will increase the probability of an errant strike, similar to the inadvertent NATO bombing of the Chinese Embassy in Yugoslavia in 1999, which could carry serious political consequences.

DOD’s systemic neglect of intelligence-gathering capabilities is perhaps the most troubling finding in the GAO report. Effective and reliable intelligence is a critical component of a PGS capability. As GAO explained, intelligence operations will serve four key functions in a PGS: monitor and integrate intelligence to analyze adversary intentions, locate and identify the target, track the target until desired effect is achieved, and assess the battlefield post-strike.²¹ Cartwright has listed rapid intelligence collection, integration and analysis as a distinguishing feature of the PGS concept: “[I]t encompasses both the ability to plan rapidly, to apply the precision to the intelligence and gather intelligence in a very rapid manner, and then to apply that intelligence to the target and understand the effect we want to create.”²² As GAO and Cartwright both made clear, a PGS weapons system is only one half of the equation; the corresponding intelligence capability must also exist in order to create an effective PGS capability.

DOD’s First Attempt to Develop a PGS Weapons System

Because nuclear ballistic missiles are the only weapon in the U.S. arsenal with an essentially global strike capability, the Pentagon initially sought to achieve a PGS capability by placing conventional warheads on them. Additionally, according to its advocates, such a program would be relatively inexpensive, technologically feasible and militarily effective. They also argue that it would reduce U.S. dependency on nuclear weapons by enabling the United States to conduct rapid, long-range strikes “without crossing the nuclear threshold.”²³ Both the Air Force and the Navy have taken steps to develop conventionally armed long-range missiles. However, as is discussed below, Congress is skeptical of this concept and has withheld the funding DOD requested to develop and deploy the Navy’s conventional missiles by 2008.

Conventional Trident Modification Proposal

Until recently, the Navy's efforts to develop a conventional submarine-launched ballistic missile (SLBM) centered on the Conventional Trident Modification proposal (CTM), which would place conventional warheads on Trident II ballistic missiles aboard Trident submarines.²⁴ The congressionally-mandated report by the National Academy of Sciences (NAS) concluded that the CTM proposal offers the only viable conventional PGS capability within six years; it also clarified that the program "can be achieved, with military mission capabilities still to be quantified, at a relatively modest initial life-cycle cost because of the minimal changes required in most components of the delivery system and its infrastructure."²⁵

The 2006 QDR stated DOD's goal to deploy precision guided conventional warheads on long-range Trident II Missiles within two years;²⁶ early estimates placed the total cost of the CTM proposal at \$503 million. However, due to congressional concerns that other countries might misinterpret a conventional Trident missile launch as a nuclear strike, the program has not received full funding and no conventional Trident missiles have been developed, tested or deployed.

Congress rejected the Navy's FY 07 budget request of \$127 million for CTM, withholding all funding for the program and opting to allocate \$5 million to commission a study by the National Academy of Sciences to analyze the CTM program and explore alternative conventional PGS systems.²⁷ The Pentagon asked in the FY 08 budget request for a total of \$175.4 million for CTM, which included \$36 million to modify Trident II missiles to carry conventional warheads, \$13 million for strategic systems to enable Trident submarines to carry conventional missiles, and \$126.4 million for the "Hardened and Deeply Buried Target Defeat System Program Area," which is "allocated to continue research and development into reentry vehicle technologies for the conventional Trident modification."²⁸ The conference report on the defense appropriations for FY 08 did not provide any funds for the "testing, fabrication or deployment," of the CTM program. Instead, it provided "\$100,000,000 in a new Prompt Global Strike program element within the Research, Development, Test and Evaluation Defense-Wide appropriation only for development of promising conventional prompt global strike technologies."²⁹

Air Force Programs

According to the recent GAO report, Air Force Space Command is currently examining a "midterm land-based ballistic missile system that would provide a prompt global strike capability and could be available as early as 2015."³⁰ The Air Force has indicated that it could modify existing Minuteman III and Peacekeeper missiles to carry conventional payloads at a minimum cost and with little technical difficulty, and has preliminary plans to place the missiles at Vandenberg Air Force Base in California.³¹ However, GAO reported that several technical, security and policy issues must first be resolved prior to deployment, including a variety of potential complications that could arise as a result of U.S. obligations under the 1991 Strategic Arms Reduction Treaty (START).³² Although Congress did appropriate \$12 million for the Air Force's Conventional Ballistic Missile (CBM) program in 2007,³³ the conference report on defense appropriations for FY 08

folded Air Force funding for PGS weapon systems into a defense-wide account to fund a consolidated, multiservice approach, managed by the Office of the Undersecretary of Defense for Acquisition, Technology and Logistics.³⁴ This is the same account that Congress provided as an alternative to funding the CTM proposal.

Nuclear Ambiguity

Given that U.S. intercontinental ballistic missiles (ICBMs) and SLBMs have previously only carried nuclear warheads, many analysts argue that other countries, such as Russia or China, might “misinterpret the launch of a conventionally-armed ballistic missile and conclude that they are under attack with nuclear weapons.”³⁵ Although this concern has been expressed in context of both Navy and Air Force conventional missile programs, concern over the CTM program is more acute: “To outside observers, the [Trident] sub’s conventional and nuclear weapons would appear identical—the same size, the same speed, shooting from the same locations.”³⁶

Ian Davis and Robin Dodd argue that the deployment of conventional ballistic missiles will inject an additional dose of uncertainty into any U.S. long-range missile launch. As a consequence, countries “targeted by any ICBM strike would need to treat any attack as a nuclear one if they were to avoid being open to a successful surprise US nuclear first strike.”³⁷ In other words, the United States could potentially exploit this capability by initiating a nuclear first strike under the guise of a conventional long-range missile launch. The implication of this argument is that deploying long-range ballistic missiles with conventional warheads will further complicate any efforts to reduce the readiness level of other states’ nuclear weapons, as they will feel that their arsenals are even more vulnerable to a U.S. first strike. Whether reducing the readiness level of nuclear weapons should be on the agenda in future arms control negotiations is a separate issue, but its omission from such should be the result of a conscious policy decision, not an unintended and unexamined consequence of a new weapon deployment.

A recent article in *Arms Control Today* quotes a Russian source echoing this very concern: “Prompt global strike is very dangerous [because] you never tell what the load [is] when a strategic missile is launched.”³⁸ Former Russian President Vladimir Putin has expressed similar concerns: “The launch of such a missile could provoke an inappropriate response from one of the nuclear powers, could provoke a full-scale counterattack using strategic nuclear forces.”³⁹ Similarly, the congressionally-mandated NAS report affirmed that such concerns “merit serious consideration,” and also recommended “providing a modest amount of applied research (6.2) funding towards measuring the more challenging hypersonic flight technologies needed for other longer-term CPGS [conventional prompt global strike] options envisioned by the Air Force and the Army.”⁴⁰

The Air Force has proposed several technical, political and operational measures to mitigate the ambiguity problem. Technical measures include placing conventional ICBMs at different bases and on different launchers than nuclear missiles as well as designing distinct launch trajectories for conventionally armed ICBMs. Political

measures include initiating a wide-ranging strategic dialogue to inform other countries, such as Russia, about these technical measures. The United States could also allow on-site inspections to verify the location of conventional ICBMs and even notify certain countries in advance of a long-range ballistic missile launch.⁴¹ Cartwright summarized the basic objectives of these measures: “[The goal is to] get that more transparent environment...The more you keep it transparent, the better.”⁴² Although several of the Air Force’s proposed technical measures are inapplicable to CTM, advance notification of an impending launch and information campaigns educating other countries about the technical differences between conventional and nuclear missiles might work for both the Air Force and Navy programs.

Although these measures may mitigate the risks of misinterpretation and alleviate the concerns of other countries, the NAS report argued that “the ambiguity between conventional and nuclear payloads can never be totally resolved.”⁴³ What is more, Amy Woolf raises the question of whether any of these measures will remain effective in the event of an actual strike with conventionally armed ballistic missiles, as the very rationale underlying their deployment is to allow the United States to execute rapid strikes with little warning or preparation time, especially in a crisis situation. For these reasons, she notes, it is worth questioning whether the United States will have time to consult with or inform other countries of an impending strike.⁴⁴

Assessing the Rationales for PGS

The principle rationale behind PGS is to deter and defeat emerging threats in the post-Cold War environment. Given the PGS mission’s emphasis on speed and global reach, it is clear that DOD believes that these threats will manifest themselves in the form of elusive targets. This indicates that DOD is envisioning situations in which the military must be able to strike WMD facilities, remote terrorist enclaves and any combination of the two that could mount a precipitous attack against the United States.

The NAS letter report cites three scenarios in which the United States would benefit from a conventional PGS option. In the first scenario, the United States has learned of a terrorist group’s plan to transport a nuclear weapon, “there are no U.S. military forces close to the expected shipping point,” and a nuclear-armed ballistic missile is the only U.S. weapon that can reach the shipping point in time.”⁴⁵ In the second scenario, an enemy state is preparing to launch a nuclear-armed ballistic missile from a location that is out of range of conventional forces. In the third scenario, the United States knows the location of a terrorist but does not have any conventional forces capable of striking the location at the right time.⁴⁶

A conventional PGS capability would be useful in each of these instances, but that does not mean that it is a necessity. Although it is impossible to predict with absolute certainty where such threats will materialize, to “a considerable degree, it will be possible to identify the regions in which a need for launch is most likely.”⁴⁷ The United States can, and does, strategically place aircraft, submarines and surface ships armed with precision weaponry in the locations where crisis situations are most likely to occur. This should

enable effective response to the NAS scenarios. As Woolf describes, “the U.S. Navy deploys its forces around the world and maintains capabilities near likely areas of conflict. A few targets may be out of range for these weapons, but bombers armed with cruise missiles might be able to reach them.”⁴⁸ For instance, with regards to the second scenario, there are only a handful of countries that are capable, or will be capable in the foreseeable future, of launching a nuclear-armed ballistic missile. Therefore, the United States has the luxury of being able to anticipate the potential locations of such a launch and project the necessary force posture in advance of a crisis situation.

Admittedly, anticipating the location of the first and third scenarios is more difficult, as terrorists could conceivably convene or smuggle nuclear material anywhere in the world. However, a scenario in which the United States knows the exact location of a terrorist or terrorist shipment, but can only respond with an immediate military strike, is highly implausible. If the United States possessed the intelligence necessary for a PGS, a rapid strike may not be required. For instance, the United States could contact governments in the region and provide them with the precise locations of the terrorists. If the regional governments are unable or unwilling to assist the United States, the United States could potentially use spy satellites to monitor the locations of the terrorists and track their movements until the appropriate forces are in place. Even if the United States was unable to hone in on the terrorists before they leave the identified location, such precise intelligence would enable the United States to initiate a massive manhunt in the surrounding area using satellites, aircraft and even ground troops if necessary. Obviously, one can imagine specific scenarios in which this response would be suboptimal, but the important point is that possessing the intelligence necessary for a PGS will create other options as well. That the possession of such intelligence is highly unlikely casts as much doubt on the feasibility of PGS capability as it does on alternative policies that are also contingent upon knowing the exact location of the target.

The “tailored deterrence” component of the “new threats” rationale is also questionable. To be sure, a conventional PGS could strengthen the U.S. deterrent against rogue states. That the strike would be conventional could make U.S. promises of retaliation to attacks against its allies more credible, as the severity of the response may be perceived as more proportionate to the offense. Additionally, the rapid, global character of the capability may convince potential aggressors that any attempted missile launches would stand a high probability of being stymied by a U.S. preemptive attack.

However, while foreign decision-makers may see the United States as “self-deterred,” they may instead perceive the United States as perfectly willing to resort to military force in crisis situations, or at least adopt this perception when weighing the costs and benefits of certain policy decisions. This is a distinct possibility. The current combination of U.S. nuclear and conventional weapons and delivery capabilities gives the United States the ability to mount a devastating response to any WMD provocation. The two states that are considered by U.S. policy-makers as most likely to launch such an attack, North Korea and Iran, would be unable to withstand the sustained U.S. military campaign that such an attack would justify. Therefore, although North Korea and Iran may be uncertain of the

scope of any retaliatory strikes, the mere possibility of a U.S. response may sufficiently deter an attack against the United States and its allies. What is more, a PGS capability may not augment deterrence. For instance, other countries may be cognizant of the nuclear ambiguity concerns associated with the conventional long-range missile concept and doubt the willingness of the United States to use such a missile in a crisis. The important point is that it is impossible to determine the precise effects that a PGS capability will have on the strategic calculus of U.S. adversaries. This is especially true of most of the countries that the United States categorizes as “rogue,” as their authoritarian political systems make it even more challenging to gauge the perceptions and assumptions of relevant decision-makers.

These observations are important to bear in mind when weighing the risks associated with conventionally armed ballistic missiles against the perceived benefits of deploying such a weapon system. If conventional ballistic missiles merely enhance U.S. force options, rather than fill a critical gap, a cost-benefit analysis may dictate against their deployment and eventual use.⁴⁹ DOD’s inattention to the enabling capabilities required to support a PGS capability calls into question its ability to develop an effective PGS capability. Similarly, the nuclear ambiguity issue associated with conventional ballistic missiles demonstrates that deploying a PGS system entails serious tradeoffs. In a worst case scenario, the United States could face the risks associated with deploying conventional ballistic missiles even as it lacks the necessary enabling capabilities to “benefit from the unique characteristics of long-range ballistic missiles.”⁵⁰

The FY 2009 Budget and the Future of the PGS Program

The Bush administration asked for \$117.6 million for the PGS program in its FY 09 budget request. This includes “funds to research a long-range, land-based Conventional Strike Missile and technologies for a submarine-launched system, as well as some funds for the Falcon project of the Defense Advanced Research Projects Agency (DARPA).”⁵¹

Although the Defense Appropriation Act of 2008 was believed by many to have put the nail in the coffin of the CTM proposal, DOD has recently stoked concerns that it might be trying to continue the development of conventional Trident missiles. As required by Congress, DOD submitted a report in March 2008 detailing how it would allocate the \$100 million in PGS funding it received in 2008 as well as it how it plans on using the \$117.6 million it is requesting for FY 09. *Global Security Newswire* reports that DOD intends to devote a total of \$9 million to prepare and test the Life Extension Test Bed (LETB-2) re-entry body on a Trident D-5 missile. The article describes the LETB-2 as a “modification that the defense contracting giant Lockheed Martin has proposed making to the Trident D-5 missile’s Mk re-entry body, which would greatly increase the weapon’s accuracy.”⁵² The concern over the LETB-2 test stems from the similarities between the LETB-2 and previously developed re-entry technology that was being incorporated into the CTM proposal.⁵³

The Pentagon also plans on spending \$58 million in FY 08 and \$70 million in FY 09 to test a Hypersonic Technology Vehicle (HTV) in 2009. *Global Security Newswire* reports

that DOD believes that “such a weapon could be launched by rockets into lower space, skip across the top of the atmosphere for thousands of miles, then glide back into the atmosphere and maneuver precisely into a target at hypersonic speeds.”⁵⁴

The Air Force has been exploring the PGS potential of hypersonic glide vehicle technology in cooperation with DARPA, originally under the FALCON (Force Application and Launch From Conus [Continental United States] program, since 2003. FALCON’s purpose was to demonstrate that “a common set of technologies can be matured in a revolutionary manner that will produce a near-term (circa 2010) operational capability for prompt global strike from the continental U.S.”⁵⁵ FALCON aimed to achieve this capability through the development of a Common Aero Vehicle (CAV) that “would be an unpowered, maneuverable, hypersonic glide vehicle capable of carrying approximately 1,000 pounds in munitions or other payloads,” and possess a geographic reach of 3,000 nautical miles.⁵⁶ The fact sheet for the FALCON program also noted that it planned on developing a reusable Hypersonic Cruise Vehicle by 2025. This aircraft would take off from a conventional runway, be able to strike targets 9,000 nautical miles in less than two hours and carry “a 12,000-pound payload consisting of Common Aero Vehicles (CAVs), cruise missiles, small diameter bombs or other munitions.”⁵⁷

Congress gave CAV more funding than DOD requested in FY 04 and 05; however, due to congressional concerns that other countries might misinterpret the launch of CAV as a nuclear strike, the FY05 funding was granted on the condition that it not be used to test a CAV variant that included conventional or nuclear weapons.⁵⁸ In FY 06 and 07, DOD changed the name of CAV to Hypersonic Technology Vehicle and restructured the program to exclude the development of weapons capabilities. Congress appropriated \$27.2 million and \$33.4 million for this program in FY 06 and FY 07 respectively.⁵⁹ Although the conference report on defense appropriations for FY 08 folded CAV funding into the defense-wide PGS account, the report also kept separate funding for the FALCON (now officially called Falcon) program in DARPA.⁶⁰ The Army is also exploring hypersonic vehicle technology, although not as part of the PGS mission.

Both the House and Senate FY 09 defense authorizations bills recommend additional funding for hypersonic vehicle development in pursuit of a PGS capability. The House bill recommended that an additional \$7 million be allocated for the Army’s hypersonic vehicle study and that the Army coordinate its program with the PGS program. The Senate bill recommended that an additional \$30 million be added onto DOD’s \$117.6 million request, \$45 million of which will be solely for the hypersonic vehicle.⁶¹ In June 2008, an engineer affiliated with the Air Force’s PGS programs went on record with *Jane’s Defense Weekly* saying that the Air Force has planned a weaponized flight test of a hypersonic test vehicle under the Falcon program for 2010.⁶² However, as of July 11, 2008, neither the Air Force nor DARPA has officially confirmed that any such test has been planned. Although both the House and Senate bills linked the additional funding for hypersonic vehicle development to the PGS program, neither report explicitly authorized a hypersonic weapon test. As noted in the previous paragraph, Congress prohibited testing of a weaponized CAV variant in 2005. At this point, it is unclear if Congress will thwart the test by placing similar restrictions on the use of the funding allocated for the

hypersonic vehicle technology in the FY 09 or FY 10 budget. Therefore, depending on technological developments and the FY 09 defense budget legislation, the hypersonic glide vehicle may be the new preferred weapon system of PGS advocates.

Clearly, DOD remains committed to the acquisition of PGS capability, and is continuing to pursue weapon systems it believes will achieve this end. This is not surprising. The notion of a rapid, long-range strike option is understandably appealing to the Pentagon, as it could potentially provide a capability that may be useful in a variety of situations, place fewer U.S. personnel at risk and eliminate overflight complications. However, weapon systems developed in pursuit of a PGS capability could raise the probability of an inadvertent nuclear exchange and complicate future arms control negotiations. Accordingly, the ramifications of a PGS capability must be considered within the context of U.S. arms control, nonproliferation and nuclear safety objectives. Only then will policy-makers and Congress be able to make informed assessments of the potential advantages, risks and tradeoffs of PGS. As members of Congress consider future DOD budget requests for PGS programs, they should take care to remember that achieving a PGS capability is not an end in and of itself; it only has value in as much as it helps the United States achieve its broader goals of thwarting attacks on the U.S. homeland, promoting a stable international environment and preventing further proliferation and use of WMDs.

¹ Department of Defense, "Nuclear Posture Review," *Forward*, December 31, 2001, <http://www.globalsecurity.org/wmd/library/policy/dod/npr.htm> /.

² General James E. Cartwright, Commander of United States Strategic Command, Statement Before the Strategic Forces Subcommittee, Senate Armed Services Committee, Hearing on Global Strike Plans and Programs, March 29, 2006, <http://armed-services.senate.gov/statemnt/2006/March/Cartwright%20SF%2003-29-06.pdf> /.

³ Keith Payne, "Letter to the Editor," *Defense News*, March 15, 2004, and cited in Amy F. Woolf, "Nuclear Weapons in U.S. National Security Policy: Past, Present, and Prospects," Congressional Research Service, RL34226, January 28, 2008, <http://www.fas.org/sgp/crs/nuke/RL34226.pdf> /.

⁴ "Quadrennial Defense Review Report," Department of Defense, February 6, 2006, <http://www.defenselink.mil/qdr/report/Report20060203.pdf> /.

⁵ Sgt. Sara Wood, "Conventional Missile System to Provide Divers, Rapid Capabilities," *American Forces Press Service*, March 9, 2006, <http://www.defenselink.mil/news/newsarticle.aspx?id=15225/>.

⁶ General James E. Cartwright, Commander of United States Strategic Command at the Activation Ceremony for the Joint Functional Component Command for Global Strike and Space, and cited in: Hans M. Kristensen, "Global Strike: A Chronology of the Pentagon's New Offensive Strike Plan," Federation of American Scientists, March 15, 2006, <http://www.fas.org/ssp/docs/GlobalStrikeReport.pdf> /.

⁷ Wade Boese and Miles A. Pomper, "Strategic Decisions: An Interview With STRATCOM Commander James E. Cartwright," *Arms Control Today*, June 2006, http://www.armscontrol.org/act/2006_06/CartwrightInterview.asp/.

⁸ Change 2 in Unified Command Plan. cited in Kristensen, 2006.

⁹ Government Accountability Office, "Military Transformation: DOD Needs to Strengthen Implementation of its Global Strike Concept and Provide a Comprehensive Investment Approach for Acquiring Needed Capabilities," *GAO-08-325*, April 30, 2008, <http://www.gao.gov/new.items/d08325.pdf/>.

¹⁰ U.S. Strategic Command, "Joint Functional Component Command for Global Strike and Integration," JFCC-GSI Fact Sheet, http://www.stratcom.mil/fact_sheets/fact_gsi.html (accessed July 1, 2008).

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- ¹¹ GAO, pp. 8-9.
- ¹² Ibid.
- ¹³ Ibid., p. 10.
- ¹⁴ Ibid., p. 36.
- ¹⁵ Ibid., p. 13.
- ¹⁶ Ibid., p. 39.
- ¹⁷ Ibid., p. 24.
- ¹⁸ Ibid., p. 25.
- ¹⁹ Ibid., p. 27.
- ²⁰ Ibid., pp. 27-28.
- ²¹ Ibid., pp. 24-25.
- ²² U.S. Congress, Senate Committee on Armed Services, Subcommittee on Strategic Testimony of Admiral James E. Cartwright, Commander, U.S. Strategic Command Hearing, April 4, 2005, and cited in: Amy F. Woolf, "Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress," Congressional Research Service, RL33067, January 19, 2007, <http://www.fas.org/sgp/crs/nuke/RL33067.pdf> /.
- ²³ Sgt. Sara Wood, American Forces Press Service, 2006.
- ²⁴ GAO, 2008, p. 21.
- ²⁵ Committee on Conventional Prompt Global Strike Capability, National Research Council, "Conventional Prompt Global Strike Capability: Letter Report," National Academy of Sciences, May 11, 2007, http://books.nap.edu/openbook.php?record_id=11951&page=1/.
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- ²⁷ Amy F. Woolf, "Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress," Congressional Research Service, RL33067, January 19, 2007, <http://www.fas.org/sgp/crs/nuke/RL33067.pdf> /.
- ²⁸ Ibid.
- ²⁹ The U.S. House of Representatives, "House and Senate Conference Report on the Defense Appropriation Act of 2008 (H.R. 3222)," Committee on Rules, November 6, 2007, p. 210, http://www.rules.house.gov/110/text/110_hr3222crtxt.pdf /.
- ³⁰ GAO, 2008, p. 22.
- ³¹ Amy F. Woolf, "Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress," Congressional Research Service, RL33067, p. 11, January 19, 2007, <http://www.fas.org/sgp/crs/nuke/RL33067.pdf> /.
- ³² GAO, 2008, p. 22. For a detailed discussion of potential START complications see Amy F. Woolf, "Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress," Congressional Research Service, RL33067, pp. 26-28, January 19, 2007, <http://www.fas.org/sgp/crs/nuke/RL33067.pdf> /.
- ³³ Amy F. Woolf, "Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress," Congressional Research Service, RL33067, p. 14, January 19, 2007, <http://www.fas.org/sgp/crs/nuke/RL33067.pdf> /.
- GAO, 2008, p. 22.
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- ³⁹ Vladimir Putin, "Annual Address to the Federal Assembly," President of Russia, May 10, 2006, http://www.kremlin.ru/eng/speeches/2006/05/10/1823_type70029type82912_105566.shtml/.
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⁴¹ Amy F. Woolf, "Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress," Congressional Research Service, RL33067, pp. 21-23, January 19, 2007, <http://www.fas.org/sgp/crs/nuke/RL33067.pdf> /.

⁴² Boese and Pomper, *Arms Control Today*, June 2006.

⁴³ NAS Letter Report, 2007, p. 4.

⁴⁴ Amy F. Woolf, "Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress," Congressional Research Service, RL33067, pp. 22-23, January 19, 2007, <http://www.fas.org/sgp/crs/nuke/RL33067.pdf> /.

⁴⁵ NAS Letter Report, 2007, p. 3.

⁴⁶ *Ibid.*, pp. 3-4.

⁴⁷ *Ibid.*, p. 6.

⁴⁸ Amy F. Woolf, "Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress," Congressional Research Service, RL33067, pp. 29, January 19, 2007, <http://www.fas.org/sgp/crs/nuke/RL33067.pdf> /.

⁴⁹ *Ibid.*, p. 29. Woolf's conclusion differs slight than the one presented in this report, as she argues that long-range ballistic missiles would be necessary in the rare event that the United States "had no warning, needed a prompt attack, and had to reach too far inland for sea based systems. But even in these circumstances, the benefits of the use long-range ballistic missiles might not outweigh the risk."

⁵⁰ *Ibid.*, p. 29.

⁵¹ Boese, *Arms Control Today*, 2008.

⁵² Elaine M. Grossman, "Navy to Launch Controversial Weapon Next Year," *Global Security Newswire*, April 3, 2008, http://www.nti.org/d_newswire/issues/2008/4/3/a0e13e91-b114-44a6-9c03-d14e9a3a909b.html/.

⁵³ *Ibid.*

⁵⁴ *Ibid.*

⁵⁵ Defense Advanced Research Projects Agency, "FALCON (Force Application and Launch from CONUS Technology Demonstration Program Fact Sheet," DARPA, November 2003, http://www.darpa.mil/body/news/2003/falcon_fs.pdf (accessed July 2, 2008).

⁵⁶ *Ibid.*

⁵⁷ *Ibid.*

⁵⁸ Amy F. Woolf, "Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress," Congressional Research Service, RL33067, pp. 13-14, January 19, 2007, <http://www.fas.org/sgp/crs/nuke/RL33067.pdf> /.

⁵⁹ *Ibid.*

⁶⁰ The U.S. House of Representatives, "House and Senate Conference Report on the Defense Appropriation Act of 2008 (H.R. 3222)," Committee on Rules, November 6, 2007, p. 210, http://www.rules.house.gov/110/text/110_hr3222crtxt.pdf /.

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