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The New Triad, Disarmament and Strategic Stability

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Introduction

In publishing its Nuclear Posture Review – NPR[1]) in December 2001, the United States reformulated the fundamental aspects of their defense strategy hitherto based mainly on the possession of nuclear weapons. This reformulation was desired by President Bush and his security team, and is based on a series of technical and political observations.

Firstly, the nature of strategic opponents of the United States has changed profoundly since the beginning of the 1990s, marking the end of the Soviet Empire. Although Russia has been perceived as a possible partner in the long term, the Russian threat has not entirely disappeared as Moscow still deployed several thousand nuclear weapons, essentially aimed towards the United States. However, threats from other countries appear to be more worrisome because they originate from competitors who have nuclear weapons or countries considered to be hostile that could, through a series of non-conventional actions (including the acquisition or even the use of nuclear, biological or chemical weapons), jeopardize American interests. The proliferation of weapons of mass destruction is now combined with the emergence of mass terrorism capable of striking the United States on its homeland or its interests around the globe, with catastrophic consequences in human and economic terms and also possibly in political and military terms.

Washington believes that the possession of a sophisticated nuclear capacity alone will not be sufficient to deal with these new threats, even though it still appears as absolutely necessary. *As a minimum*, the volume and nature of this arsenal must be reconsidered to adapt to the post-Cold War situation. However, the remainder of this study does not deal with the problem of American nuclear capacities.

Technological progress in military systems has contributed to the development of systems with strategic objectives; to defend the American homeland and to defeat opponents against whom traditional deterrent means may be ineffective. Thus, theoretically the United States could use precision weapons equipped with conventional warheads, cruise missiles or ballistic missiles to neutralize or threaten high value political or military targets. Similarly, missile defense currently being deployed can significantly limit the usefulness of a non-conventional enemy attack carried by ballistic missiles.

The new triad (the former triad being composed of land, sea and airborne nuclear means) establishes the strategic role of some conventional weapons in a renewed vision of military means capable of "*relatively quickly and substantially modifying the action mode of an opponent*"[2]. This vision is organized around four conceptual themes:

- Prevent the use of non-conventional weapons against the interests of the United States, in the American homeland or elsewhere, by increasing the potential cost of use for the adversary. A priori, this is an extension to the logic of the conventional deterrence concept.

[1] Department of Defense, « Nuclear Posture Review », submitted to Congress 31 December 2001.

[2] Defense Science Board, « Future Strategic Strike Forces », Office of The Secretary of Defense Acquisition, Technology, and Logistics, US Department of Defense, February 2004, p. 1.

- Mitigate the effect of use against American interests (for example directly against American civilians/forces, or indirectly against its main allies) by protection and defense means.
- Reduce the advantage to an opponent of initiating development, production or deployment of non-conventional weapons, including by being able to neutralize his industrial capacities by force.
- Inflict serious damage or even neutralize high value, time sensitive or protected/camouflaged targets without the use of nuclear strikes.

The United States must be able to use two fundamental capabilities to enable the use of these four themes:

- Firstly, a capability for technological innovation and use of these innovations in programs for commissioning and/or modernizing its military means. The objective is to be capable of accelerating the transition between military system development, production and deployment phases, so as to maintain the existing lead in capacity[3]. Consequently, strategic priorities are flexibility and reactivity of industry. Furthermore, the conventional image of the fourth pillar of the NPR, namely that covering nuclear infrastructures, is included in this concept of "reforming the industrial base"[4].
- Secondly, the possibility of creating coalitions between countries that will be capable of providing capacities complementary (or supplementary) to the United States, in the long term, and accepting some deployment zones or zones which might participate in operations, or militarily or diplomatically sustain them, in the short term. This alliance concept forms part of a logic of rapid response to a strategic surprise using regional/local capacities integrated into a more global American system. As an example, integration of Japan into the American antimissile defense program must allow for the coordination of American and Japanese capabilities to defend the Japanese ally, but also to protect American forces in the Pacific and American homeland. The breakdown of American strategic offensive and defensive capacities with their allies is aimed particularly at increasing the reactivity of American means by guaranteeing physical access to the largest possible number of theatres.

In practical terms, the development recommended by the NPR in 2001 involves a series of developments and operational deployments forming part of the United States range of strategic capabilities. For defense means, the *Missile defense* project redefined in 2001 from the Clinton administration's *National Missile Defense* program, is materialized by the deployment of several interceptors in California and Alaska on the West coast. In the field of offensive means, apart from the ongoing modernization of cruise missiles to make them more reactive in use, American leaders are examining the feasibility of modifying strategic ballistic missiles for conventional long range strikes (*Prompt Global Strike*). Such a capability would allow the United States to attack targets anywhere in the world without any carriers being close to the targeted zone, in a few tens of minutes and with a precision of a few meter. Therefore, it would at least

[3] Ibid, p. 4.

[4] « The Nuclear Posture Review », Submitted to Congress on December 31st, 2001.

partly solve problems of access to a theatre (necessary for the use of cruise missiles) and neutralization of time sensitive targets[5].

Coordination of all conventional means that will be included in the new triad is particularly interesting in technical as well political terms. The objective, particularly in the case of missile defense, is to be able to manage means in a variety of geographic zones, for some of which regional allies are responsible. The efficiency of this coordination depends as much on the existence of appropriate technical means (communications, command system, merging of data) as the capacity to manage the operational diversity of the players involved.

Although the international debate is now focused essentially on American initiatives in missile defense, the prospect for converting intercontinental strategic missiles with conventional warheads raises several political questions.

Since it involves the possibility of co-localizing nuclear weapons carriers with conventional weapons6, their use is a potential source of incidents because their launch could be interpreted as a nuclear attack, for example by Russia's early warning system. For this reason, continuation of this project by the United States would require special measures designed to eliminate all ambiguity about the use of these weapons. This is particularly urgent because the main bilateral inspection framework, the START treaty, will expire in December 2009 and it now seems fairly unlikely that it will be extended (or even replaced).

More generally, the new triad is the result of the American observation about changes to its security environment as much as factors that could modify relations between the World's leading power and its competitors, allies and adversaries. Beijing and Moscow have decided to review their own strategic postures by modernizing their offensive strategic means and conventional military systems, and accelerating their deployment. For China, the project initiated in the 1980s is reaching maturity and should provide the People's Republic with a quantitatively and qualitatively enhanced nuclear arsenal. A review of its strategic posture would appear particularly probable as Washington is openly supporting modernization of the capabilities of China's main regional competitor India, and of Japan that is now thoroughly revising its doctrine. After the improvement of Russia's relations with the West until the end of the 1990s, we cannot help observing negative changes in the Kremlin's attitude illustrating a new equilibrium in favor of Middle Eastern or even other customer countries, and Russia's intention to maintain nuclear parity between its capacities and the United States' capacities at all costs.

Thus, the problem that arises is how to politically manage the transition between Washington's former strategic posture and the new triad. In particular, the objective is to determine how to manage the change to recreate new balances between existing and developing powers.

[5] « *Time sensitive target* », in other words targets with some mobility, that will not remain at a given location permanently.

[6] Amy F. Woolf, « Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress », the Congressional Research Service, February 9th, 2007, p. 9.

Two sorts of measures could be envisaged for this purpose:

- ⇨ Political measures, which will provide States legally holding nuclear capacities with guarantees about the nature, size and use of conventional means in the new triad.
- ⇨ Practically, measures intended to prevent evaluation errors committed by the leading powers during the development, deployment or use of the new American means.

Although theoretically, many tools could be designed to encourage the insertion of the new American concept and related means into the international framework, not all appear to be effectively implemented and some that are not currently programmed could be revived if American policy is changed. Thus, although it appears unlikely that the next American administration would wish to modify the paradigms of the new triad, it might wish to change the conditions of its deployment or its financing, and especially the accompanying measures that should be taken.

A future administration might also wish to reevaluate conventional offensive and defensive programs, to match relations that it wishes to create with other countries and to assure that they respect all commitments made by the United States. Therefore, it can be expected that the most difficult points will be negotiated with Russia and possibly with China, even though relations between Washington and Beijing would appear to make it difficult to increase mutual transparency in the strategic field.

1 – The new triad: options, progress and prospects

Since his election in 2000, President Bush and his administration have initiated several programs that, since the publication of the *Nuclear Posture Review* in 2001, will participate in the new triad.

Among these projects, the missile defense program has often been given most publicity, partly due to the magnitude of its budget[7] and partly due to its extension to cover the United States' allies in Europe and Asia. However, the *Missile Defense* (MD) program has two unique characteristics that differentiate it from most other major defense projects. Firstly, the "spiral" experimental nature of the development recommends incremental deployment of systems within a flexible architecture. Secondly, the stated intention of commissioning a system as early as 2004 to benefit from elements of an American homeland defense. Furthermore, released from the constraints fixed by the ABM treaty in 2001, the American administration is in a position to continue this program with the aim of an operational deployment.

Offensive system development programs have not received the same level of publicity, and most of them have not received comparable financing. However, the US Navy and the US Air Force have restarted several projects since the publication of the defense review in 2006[8] and the development of the « *Prompt Global Strike* » concept in 2005[9]. The use of existing ICBMs (Trident or Minuteman) would make reconversion programs less expensive, but they would require the development of new warheads, and especially it would make fast deployment of initial capacities possible (within a few years). In any case, no one in Washington is considering a massive deployment of conventional strategic means, but rather setting up of a limited capacity to enable isolated treatment of some high strategic value targets.

Image 1: Artist's impression of the X-51 hypersonic missile (source Popular Mechanics)

Considering cruise missiles, the Tomahawk block-IV should begin to be deployed in the American Air force and Navy within the next few years[10]. Since the middle of the 1990s, the Pentagon has committed itself to developing a hypersonic cruise missile with a speed of up to 5 times the speed of sound, that could satisfy prompt strike needs. Such

[7] The budget approved by Congress in 2006 was 8.7 billion dollars. See Steven A. Hildreth, « Missile Defense: The Current Debate », Congressional Research Service, July 19, 2005, p. 1.

[8] *Quadrennial Defense Review report* 2006, http://www.defenselink.mil/pubs/pdfs/QDR20060203.pdf

[9] Amy F. Woolf, « Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress », op. cit., p. 5.

[10] « Block IV Tomahawk Cruise Missile for US and Royal Navies », Raytheon, March 17th, 2006.

a missile, for example fired from a strategic bomber, could reach a target at a distance of 2 000 km in less than half an hour[11].

Thus, embryonic versions of several systems designed to materialize the new triad required by the administration could apparently be deployed before the end of the current president's mandate. However, the variety of institutional players involved (US Navy, Air Force, STRATCOM) raises the difficult question of the conditions of use of systems that could be deployed, and the choice of targets and operational coordination.

Furthermore, the real efficiency of these future means depends largely on their environment, and particularly their capability to collect, transmit and use information. Is the path from observation to decision, as it exists at the moment, adapted to the nature of targets at which prompt strategic strikes might be aimed?

1.1 – State of progress of American systems contributing to the new triad

The first step is to summarize progress with the development of offensive and defensive systems intended to contribute to the new triad. We will use this as a starting point to determine how the principles on which it is based have been transcribed into military concepts and doctrines, and we will attempt to analyze the consistency of these doctrines firstly with the envisaged means and secondly between themselves.

1.1.1 – Towards the deployment of a global missile defense

The budget set aside for antimissile defense has increased from about 4 billion to about 7-9 billion dollars per year since President Bush's election in 2000. This increase corresponds to the end of the development of several systems (some of which are expected to come into service before the end of the decade or have already been delivered to the Armed Forces), and also to several projects currently under development. However, it is largely due to the first homeland defense capability deployment plan, of which the first elements came into service in 2004.

Since 2002, the administration's plans have followed complementary guidelines that have led it to rebalance its budget and terminate the few programs considered to be technically unrealistic, too expensive or redundant compared with others[12]. These guidelines are as follows:

- Develop a series of complementary means, in terms of the interception and deployment mode. Thus, the acquisition of mobile and multi-platform systems for interception and for detection must increase the American capability of satisfying a particular regional need. The development of upgradeable complementary multilayered systems is aimed at improving the global performance of the architecture to face a variety of threats. In this view, the distinction between theatre and homeland defense has been abandoned. Furthermore, the project now satisfies a flexibility logic intended to satisfy changes to the needs, concerning the appearance

[11] Noah Shachtman, « Hypersonic Cruise Missile: America's New Global Strike Weapon », *Popular Mechanics*, January 2007 issue.

[12] The best known case is cancellation of the *Navy Area Defense* low layer naval defense program in 2001. See Steven A. Hildreth, « Missile Defense: The Current Debate », op. cit., p. 34.

or modification of the threat or the operational context. Therefore, the strategy for acquisition of the missile defense sytems has been adapted to enable a changing approach designed to create a permanent development-test-deployment-modification cycle. Therefore, the configuration of the system has not been fixed and it could be changed as a function of experience feedback, the appearance of new technologies and changes to the threat[13]. This incremental approach also provides a means of making operational deployments more quickly, which satisfies the plan put forward by the Republican administration. However, the "spiral" development does cause some difficulties, both in terms of budget planning and legislative overseeing of its development. While it is practically impossible for Congress to obtain information about expected performances for systems or even production levels under these conditions, measures to enhance the program's confidentiality have also been in force since May 2002 by the administration, particularly concerning the results of development tests[14].

➡ Extend participation in the project to the United States' allies. The fundamental difference between the internationalization proposed by the previous administration and the current approach is related to the effort to integrate local means into a unique system, to increase the final protection level of the United States. To achieve this, Washington considers that it should procure an equivalent protection level for its closest allies and partners, and also make it possible for its allies systems to be used within an extended American command and control network to defend the American homeland and forces. Several methods have been adopted to achieve this, varying from the co-development of systems (Japan, Israel), to the regional implementation of American means. However, in all cases, the United States has attempted to strengthen the existing level of operational coordination.

FISCAL YEAR	2001	2002	2003	2004	2005	2006	2007
Budget requested by the President *(in billions of dollars)*	**4.5**[15]	**8.3**	**6.7**	**7.7**	**9.2**	**7.8**	**9.3**
Budget appropriation *(in billions of dollars)*	**4.8**	**7.8**	**7.4**	**7.7**	**9**	**7.8**	**9.4**

Table No. 1: FINANCING OF THE *MISSILE DEFENSE* PROJECT

(source Missile Defense Agency)

The project control process has been transformed, to match changes to the objectives of the antimissile defense program. Thus, technical and operational management of developments was granted to a single agency (the *Missile Defense Agency*), created in

[13] Ibid, p. 14.

[14] Ibid, p. 17.

[15] This budget originated from the previous legislature. The first budget proposed by the Bush administration was 2002. See Steven A. Hildreth, « Missile Defense: The Current Debate », op. cit., p. 3.

2002 to federate a disparate set of programs controlled by several services or organizations[16]. Apart from the additional consistency that this decision should bring to programs, it was also intended to facilitate horizontal integration of all means within a single command loop. Operational results from this federation of efforts include also the production of doctrine documents (for example an operation concept[17]) and the definition of the political and military system responsible for managing the antimissile defense architecture. In particular, the objective was to clarify the responsibilities of the various commands responsible for planning and employment. The decision taken by the American President in 2002 consists essentially of separating planning and coordination, done centrally, and the use of missile defense for which the regional commanders are responsible[18]. Thus, *Strategic Command* (STRATCOM) is responsible for the preliminary part and coordination, while regional commands have to defend zones for which they are responsible, including NORTHCOM for the continental United States. The organization set up apparently makes regional commands responsible for the local coordination of systems, so that they are in a position to control integration of allied assets in the US command and control loop.

The operational reorganization decided upon in May 2002 is particularly judicious when considering the variety of systems involved in missile defense and their different although complementary role in the "missile battle".

➡ Early Warning and Tracking

The American warning system is based both on spatial means and on fixed or mobile radar systems. The complete system must be capable of providing complementary solutions in terms of frequency spectrum, so as to detect missile launches, define their paths and to discriminate a warhead among a ballistic cluster that may include decoys and debris.

At this stage, the United States has a constellation of 6 to 8 geostationary satellites belonging to the *Defense Support Program* (DSP) and that now provide a global warning on the launch of long range ballistic missiles[19]. Due to this detection limit, a program was launched in 1994 to replace DSP geostationary satellites and to add a lower orbit capability. The *Space Based Infrared System* (SBIRS) includes a high orbit geostationary component (called SBIRS High) and a low orbit part (called the *Space Tracking and Surveillance System* (STSS)) that must enable discrimination and flight path mapping missions[20].

[16] Apart from the *Ballistic Missile Defense Organization*, the Air Force, the Army and the Navy managed their own programs.

[17] « Missile Defense « Concept of Operations » Plan Perhaps Ready by Fall », Reuters, July 25, 2006.

[18] J.D. Crouch, Assistant Secretary of Defense (International Security Policy), « United States Missile Defense Policy », Testimony before the Senate Armed Services Committee, March 18th, 2003, pp. 10-11.

[19] Marcia S. Smith, « Military Space Programs: Issues Concerning DOD's SBIRS and STSS Programs », CRS Report for Congress, January 30th, 2006, pp. 1-2.

[20] Ibid, p. 4.

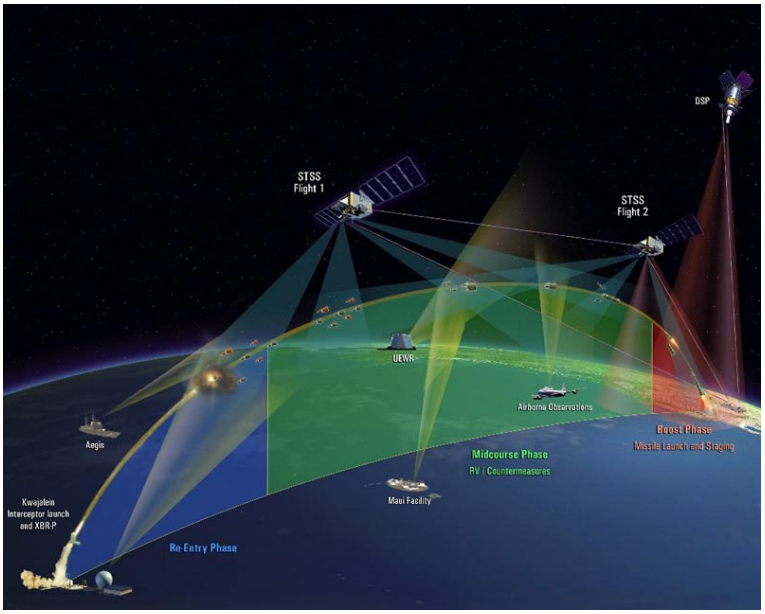


Figure 1: Diagram showing the principle of the *Space Tracking and Surveillance System*.

These two programs have been hindered by several delays causing a large increase in development costs and a delay in the launch calendar. The entire project had to be redesigned starting from 2001-2002, otherwise Congress would have canceled it. In particular, major changes were made to the calendar of the STSS program and financing allocated to the development and therefore deployment ambitions. Thus, although it is planned to launch two experimental satellites and implement the land component by 2007-2008[21], no future deployment has yet been announced for beyond 2010.

For the geostationnary part, although the *SBIRS high* project is continuing (with the launch of a first satellite in 2008), work has been started to develop a less ambitious system, the *Alternate Infrared Satellite System* (AIRSS) that could replace the DSP[22] in the short term. The AIRSS will be financed in 2008 and operational launches for it could begin in 2015. In any case, the United States should have a broader range of infrared satellite sensors by 2010, that will be able to complement ground or sea radar means for flight path mapping and for warning.

In this field, Washington is using a set of deployable and fixed means that enable it to cover the most sensitive zones, and if necessary to reinforce this coverage quickly. They include:

- Four advanced warning radar systems deployed in Shemya (Alaska, *Cobra Dane* radar), California (*Fort Beale*), Greenland (Thule) and the United Kingdom (Fylingdales)[23].

[21] http://www.mda.mil/mdalink/pdf/blk08.pdf

[22] Interviews with the author, Paris, June 2007.

[23] http://www.cdi.org/PDFs/DOTE %20FY %2006 %20report %20BMD.pdf

- Two mobile flight path mapping radar systems including the transportable *Forward Based X-band* (FBX), deployed in Japan and that forms part of the *Theatre High Altitude Area Defense* (THAAD) system, and the *Sea-Based X-band Radar* (SBX) deployed on a self-propelled naval platform. This latter radar system, on which a set of tests was carried out in 2006 before it returned to its home port in Alaska[24], is the subject of a few criticisms about its technical and operational performances, although there is no question about the advantage of such a platform[25].

Image 2 : The SBX radar

- SPY1-D detection and tracking radar systems deployed on 3 cruisers and 7 destroyers equipped with the AEGIS[26] system. These ships are capable of detecting a missile in flight and monitoring it throughout its path, enabling the use of interceptors also located on the ship.

At the time of several tests and exercises in the Pacific zone, the *Missile Defense Agency* was able to interconnect and exchange data between several flight path mapping sensors located in the sea and on the ground. Thus, on June 25 2007, three ships on which the AEGIS system was installed, including one Spanish ship[27], and a FBX radar were capable of exchanging data and identifying a separable warhead among a set of debris[28]. This test is significant because it demonstrates the feasibility of real time merging of information from a variety of sources (space advanced warning, land or ship radar systems). Consequently, the success of this test provides information about the progress of Armed Forces and the MDA in their effort towards systemic integration and setting up the American command and control network.

[24] « New Sea-Based Missile Defense Radar Completes Successful Journey to Alaska », Missile Defense Agency News Release, February 7th, 2007.

[25] Ronald O'Rourke, « Sea Based Ballistic Missile Defense – Background and Issues for Congress », CRS Report for Congress, December 19th, 2006, pp. 21-22.

[26] M. Picard, « De la composante navale de la *Missile Defense* », *Points de vue*, (About the naval component of *Missile Defense*, *Points of view*) FRS, May 24 2007, p. 4.

[27] Type F-100 destroyer.

[28] « Aegis BMDS Successfully Destroys Separating Ballistic Missile During Test », *Defense News*, June 25th, 2007.

➡ Command and control network

Due to its organizational role, the command and control network (*Command, Control, Battle Management and Communications System* (C2BMC)) is probably the most complex system to develop and deploy. It must be capable of performing several interdependent missions to enable operation of the entire missile defense at a global, regional and local level, namely merging and dissemination of data, planning and engagement management. The complexity of the system then depends not only on the diversity of the systems (sensors, carriers, interceptors), but also on the dual nature of the architecture that must be capable of functioning at a global and regional level but also in a delocalized manner within expeditionary corps or deployed forces.

Progressive deployment of the ballistic battle command and management system began in 2003-2004. As a result, the C2BMC software was installed in the main commands (STRATCOM, NORTHCOM, PACOM) as early as 2005, and then they were progressively updated to take account of new sensors[29] (SBX, FTX) as well as modernized radars in Fylingdales and Thule. The C2BMC saw the scope of American ballistic battle management means broadened in 2006 with the implementation of new updates, to include planning and merging of data from different sources, including the US Navy[30]. In particular, all users (even local commands) of the system can now access early warning information and a list of available resources (interceptors) in real time, so as to plan for their use if it is required by their commanders (and NORTHCOM for the Continental US (CONUS)).

This organization also raises the difficulty with management of ballistic threats depending on whether their effective zone is local, regional or global. Responsibilities can overlap for missiles with a range reaching the boundary of the theater or the region. As an example, a Taepodong-2 missile fired from North Korea could potentially reach areas for which PACOM is responsible, or part of the United States homeland protected by NORTHCOM. This operational problem is relevant to the development of C2BMC in that the C2BMC must create unity in command for the complete system to be efficient[31]. This is necessary particularly because engagement decisions have to be made quickly to match the rhythm involved in an antiballistic battle.

Thus, above all, the command system must be capable of facilitating the work to be done by an authority responsible for management of the ballistic battlefield in merging local, regional and then global planning made by commands, and making them coherent. This authority would also be responsible for deciding whether or not to engage specific interceptors in the case of a ballistic missile launched by a State, although this responsibility does not prevent unit commanders from firing in self-defense. Therefore in order to operate efficiently, the command system must assure that a single authority remains responsible for all operations from management to

[29] Report to Congressional Committees, « Defense Acquisitions: Missile Defense Agency Fields Initial Capabilities but Falls Short of Original Goal », US Government Accountability Office, March 2006, pp. 8-9.

[30] http://www.mda.mil/mdalink/pdf/blk08.pdf

[31] David B. Weller & James B. Michael, « Command Structure of the Ballistic Missile Defense System », 2004 at http://www.cs.nps.navy.mil/people/faculty/bmichael/pubs/ccct04-T497KK.pdf

commitment, and that this authority should be as global as possible, which would favor STRATCOM[32].

This solution raises several technical and political difficulties:

- It assumes that the C2BMC can successfully federate existing command systems within its forces, for example such as the US Navy *Cooperative Engagement Capacity*. Initially, this means that the missile defense system should be capable of participating in producing a *Single Integrated Air Picture*[33] making use of all data originating from sensors integrated in the C2BMC and in force command networks.
- But above all, it creates a need to merge the command systems of allies into the American C2BMC. Consequently, States that participate in global defense, although cooperating with operational planning, would be unable to take part in the decision to engage their systems for protection of their territory. This problem is particularly severe because the number of available interceptions will be small and therefore their use should be limited[34].

Apparently, this is the most difficult part of the US project, to the extent that the systems to be deployed by some countries engaged alongside Washington make a direct contribution to US security. Although it is feasible to envisage some sort of engagements coordination, the integration of all command systems under the authority of a single US command could raise severe political problems.

This is particularly true because the missile defense command network would most probably also be a foundation for the offensive pillar of the new triad. Global coordination between conventional counter-proliferation activities and missile defense appears logical considering the complementary contribution of the two pillars to the triad's objectives[35].

➡ Interception

Most programs started in the 1990s have continued, despite the reorientation of the missile defense policy in 2001-2002, and the termination of the *Navy Area Defense* lower tier defense program. In particular, theatre defense systems – *Patriot Advanced Capability*-3 (PAC-3) and *Theater High Altitude Area Defense* (THAAD) – are either now being deployed in the forces or are at the end of their test phase.

For boost phase intercept, the first flight tests of the airborne laser (ABL) should take place in 2008[36], even though there are still some problems with its development and its

[32] Ibid.

[33] B. Gruselle, « Missiles de croisière et stratégies d'anti-accès » (Cruise missiles and access denial strategies), Study for the CEA, December 5 2005, p. 55.

[34] The question of allocation of interceptors is particularly complex when considering the need for defense against an opposing arsenal which cannot be accurately evaluated. For a thorough study on this question, see Elaine Bunn, « Deploying Missile Defense: Major Operational Challenges », National Defense University, Strategic Forum, N° 209, August 2004, pp. 2-3.

[35] We will consider this question again later, but it can already be mentioned that STRATCOM would be the logical operational choice for coordination of operations of the offensive pillar. Ibid, p. 3.

[36] B. Gruselle, « Armes laser et défenses antimissiles : anatomie d'un débat » (Laser weapons and antimissile defenses - The current debate), *FRS Notes*, November 15 2006.

operational effectiveness is uncertain. Relatively little financial effort has been dedicated to the use of space platforms to destroy ballistic missiles in the boost phase, and work appears to be concentrated essentially on feasibility studies[37].

Image 3 : Mockup of the *Kinetic Energy Interceptor*

On the other hand, more substantial development efforts have been committed to the development of the *Kinetic Energy Interceptor* (KEI) – a high acceleration interceptor capable of making interceptions in the boost phase – for which several wind tunnel and bench tests have been carried out on the boosters[38]. Furthermore, in 2004, MDA made Lockheed Martin responsible for carrying out preliminary studies on the development of a *Multiple Kill Vehicle* (MKV) interceptor[39]. Each kill vehicle would then transport several heads capable of following independent paths once in space, either to multiply the number of interceptions on the target or to engage several opponent heads.

Two systems with strategic capacity have been changed considerably since the beginning of the 2000s:

- The *Sea-Based Midcourse System* (or *AEGIS Ballistic Missile Defense*) forms the most important and successful part of the development of antimissile defense means, in several respects. Nine of the eleven test firings were successful including the June 22 2007[40] firing, which is better than what was achieved with its land-based equivalent (GBI)[41]. Three cruisers and seven destroyers have already been declared operational, including the *USS Shiloh* deployed within the VIIth fleet in Japan during summer 2006[42]. The naval component also appears to be a good candidate for being fitted with new systems – for example an adapted KEI or multiple warheads

[37] Steven A. Hildreth, « Missile Defense: The Current Debate », op. cit., p. 19.

[38] See http://www.mda.mil/

[39] http://www.mda.mil/mdalink/html/asptmkv.html

[40] http://www.mda.mil/mdalink/pdf/07news0037.pdf

[41] M. Picard, « De la composante navale de la Missile Defense » (About the naval component of Missile Defense), op. cit., p. 4.

[42] B. Gruselle, « L'accélération du programme japonais de défense antimissile » (Acceleration of the Japanese antimissile defense program) *FRS Notes*, January 25 2007, p. 1.

(*Multiple Kill Vehicle*) – due to the versatility offered by its mobility and the possibility of making deployments close to potential firing sites. Even if the AEGIS system interceptor is beginning to be put into service, the MDA is already planning improvements to its performances and it will be handled as part of a cooperation initiated with Japan in 2003.

➡ The *Ground-Based Midcourse Defense* (GMD) is the direct descendant of the Clinton administration's *National Missile Defense* (NMD) program. It is a system designed to protect the American homeland. But unlike the NMD, and with the twofold logic of a spiral development and commitments made by President Bush in 2001, the first interceptors of the GMD were deployed starting from 2004 in Alaska (Fort Greely) and in California (Vandenberg Air Force Base). Thus the United States now has 11 missiles that, considering their location, are capable of defending the homeland against very limited attacks from Asia[43]. Furthermore, these interceptors are integrated into the Pacific test polygon (*Pacific Missile Defense Test Bed*) making it possible to perform full scale tests on equipment considered as being operational. Despite this operational deployment, the result of the *Missile Defense* ground segment test campaign since 1999 appears mixed. Furthermore, the configurations of the booster and the warhead of the interceptor have been modified in 2004 following a series of incidents during tests in 2002 and 2003[44]. Since then, two of the three tests carried out resulted in a successful interception of a missile launched from the Vandenberg base in California.

Even if the next US administration might make a detailed review of financing and technical aspects of the MD program as it has been pursued since the election of President Bush in 2001, there is no doubt that the military and political concepts subtending its development will be confirmed. In particular, the role of the conventional defense component in a newly defined triad will not be questioned. This seems particularly certain because of the success of the two main components of the program (the command and control system, and sea-based defense).

The former is undoubtedly the most likely to become the backbone of coherent management of all conventional means of the triad (and the interface with the nuclear part) due to its capacity firstly to federate diverse systems in a structured assembly, and secondly to merge and disseminate the early warning information – possibly originating from other intelligence sources found to be useful for offensive actions – to enable operational planning. Furthermore, the process of studying the command architecture and the role of the global commands (STRATCOM), regional commands (PACOM, EUCOM) and local commands in the decision system, and on the organization of operational and political interaction between defensive and offensive means, engaged for setting up the C2BMC, appears likely to influence similar works for the offensive part. Thus, progress made for the command and control network of the missile defense part could form the embryo of an operational management capacity for the conventional part of the triad.

[43] This system is also probably capable of dealing with an attack from the Middle East, but it is not obvious that it protects the East coast. Interviews with the author, March 2007.

[44] For a complete summary of ground segment tests, see Victoria Samson & Sam Black, « Flight Tests for Ground-Based Midcourse Defense (GMD) System », Center for Defense Information, Updated June 18th, 2007.

Due to successes encountered during its development, the naval component of the missile defense seems further advanced than the land based system. But apart from technical successes, several of its intrinsic characteristics appear likely to make it the main federating engine of a US project that would continue to look for boarder international support.

In practice, the *US Navy* appears to be the American Force most capable of quickly setting up necessary operational cooperation with allied navies, to actually begin constructing a common system[45]. In purely military terms, naval means for the missile defense mission offer a number of advantages in terms of positioning and mobility[46], making their participation in the system essential. The possible use of KEI for deployment on surface ships will obviously increase the general dependence of the US architecture on this component, because the fleet appears to be the only means capable of deploying and using this type of interceptor when access to the theatre is denied to land forces. For the same reasons, the US Navy should play a central role in the global strike system if the United States decides to pursue an option based on the use of hypersonic cruise missiles (launch from an aircraft belonging to a squadron of the Fleet Air Arm). However, the potential cost of the naval component of the conventional part of the triad will undoubtedly hinder its future development. This is particularly true because the development of new generations of cruisers and destroyers should significantly limit the navy's financial margin of maneuvers, even though they will benefit from improvements necessary to be fitted with interceptors or offensive missiles[47].

1.1.2 – Development of a conventional strategic component

A priori, the development of a conventional strategic capacity capable of striking any target at any location in less than an hour raises more operational questions than technical problems; more importantly than the number of ballistic vectors available to the United States for this type of mission, it is essential to know if it is possible to:

- Identify and precisely locate a target within times compatible with the characteristics of this target: measures taken by the party at which the strike is aimed to hinder neutralization by Western systems vary from camouflage (including integration of the target into a civil environment) to mobility, and include hardening and even burial. These various situations create initial difficulties with detection and the reaction time between detection and use of weapons intended to neutralize the target. Apart from the efficiency of the intelligence loop (in other words its capacity to obtain and analyze information and then timely transmit it to decision-making authorities), constraints specific to some targets may require long term planning to assure that all available means are used consistently in a possibly complex operational and/or political context[48].

[45] We will discuss this further in part 1.2.1, but we should emphasize that international cooperation and coordination between allied navies is already well developed. See M. Picard, « De la composante navale de la Missile Defense » (About the naval component of Missile Defense), op. cit., p. 1.

[46] Ibid, p. 5.

[47] In particular, an improved multi-mission vertical launch system.

[48] Defense Science Board Task Force, « Future Strategic Strike Forces », Office of the Secretary of Defense, February 2004, Chapter 2, p. 15.

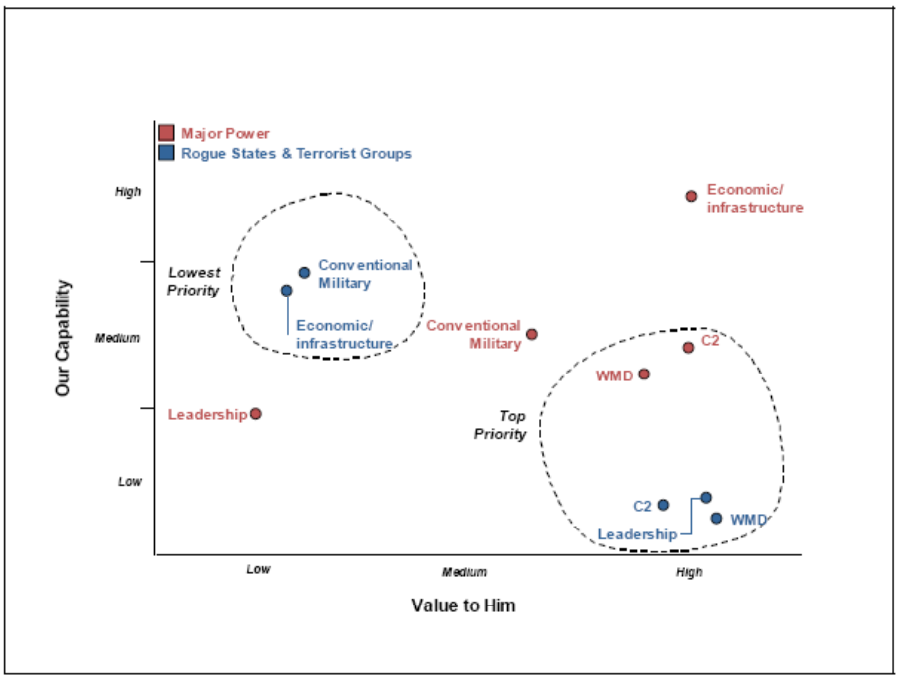


Figure 2: Existing capacities of the United States with regard to possible targets (Source Defense Science Board - DoD)

- Make a sufficiently precise and/or decisive strike to neutralize it: for a prompt global strike capacity (*Prompt Global Strike* – PGS) as envisaged by the United States to be really effective, it must be capable of destroying any objective fixed by the intelligence-action loop. The targets that create the hardest technical problems are those that are deeply buried. Their neutralization requires very high weapon precision (of the order of one meter) and a high penetration/destruction capacity[49]. At the present time, the final precision of the most precise intercontinental ballistic missile in the American arsenal is few dozen meters[50] (circular error probable or CEP), which is not nearly enough to attack underground installations. Similarly, the design of a conventional warhead capable of penetrating several meters of concrete and then destroying buried installations and that can be integrated into limited volumes, remains problematic. If the solution of a specific nuclear warhead is discarded, the development of one or even both of two possible solutions (kinetic munitions or kinetic/explosive charges combined) is probably a major technical (and therefore financial) challenge.
- Verify that the target has actually been satisfactorily neutralized; beyond the conventional assessment of physical damage caused by a strike, for example by the use of spatial compilation means, it appears necessary to obtain an evaluation about whether a target has been functionally and durably neutralized so that additional actions can be planned or an ongoing campaign can be continued, if necessary[51].

[49] Todd C. Shull, « Conventional Prompt Global Strike: Valuable Military Option or Threat to Global Stability », Naval Postgraduate School, September 2005, p. 44.

[50] This is the Trident II-D.

[51] Defense Science Board Task Force, « Future Strategic Strike Forces », op. cit., Chapter 2, p. 15.

Therefore, intelligence tools and their use should change in parallel with development of the weapons themselves.

For various reasons, the main US priority is to structure its PGS project operationally so as to be able to quickly build up an architecture capable of integrating strike capacities that will only be developed progressively due to the related technical challenges. By making STRATCOM responsible for planning and execution of this mission in October 2002, and then restructuring this global command, the American leaders decided to make it the main node for the United States' strategic action[52]. But as emphasized by the *Defense Science Board*, naming a responsible command will not be sufficient by itself to define the necessary architecture for the PGS, because the main objective is to build up a technical-operational system capable of successfully making destructive strikes on a large variety of targets (see figure 2)[53]. In turn, this necessity creates a series of objectives that must be achieved to make the global strikes system efficient:

- Cooperative and reactive planning: as for missile defense, the players involved in the preparation, implementation and monitoring of strategic strikes make their contributions at a wide variety of geographic and operational levels. Large global commands (political or military) at regional and local levels, forces, intelligence services and information collection means, all have a role to play in carrying out the action. It appears that the American command and control system is still too centralized (on a Cold War model) for these contributors to participate in long-term or short term planning, even if several political documents such as the *Quadrennial Defense Review* recommend more open architectures[54]. The principle of a cooperative network binding the different services and managers, similar to the C2BMC for antimissile defense, appears to be the best means of achieving the objective.
- Production of an integrated operational picture; the command and control system should be capable of merging intelligence information so that it can operate, together with data about available systems, their deployment and their nature. Therefore the objective is to have all information to be able to efficiently engage available means, adapted to the situation in the field.

[52] Amy F. Woolf, « Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress », op. cit., p. 5.

[53] Defense Science Board Task Force, « Future Strategic Strike Forces », op. cit., Chapter 1, p. 5.

[54] Ibid, chapter 3, p. 14.

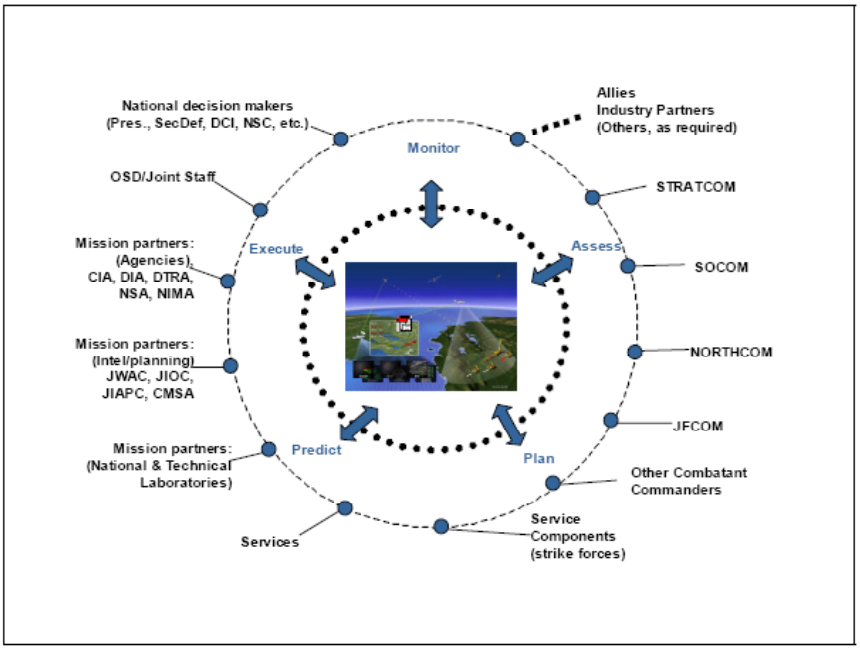


Figure 3 : Principle diagram for a conventional strategic action command and planning architecture
(Source: *Defense Science Board*)

These two constraints make it necessary to produce a new command and control system (fairly similar to that used for antimissile defense) under the control of STRATCOM. Central command would thus logically be responsible for supervising the technical development, including through tests networking real systems, but also setting up this system in operations. For the latter, an operations concept will have to be produced to define the role and responsibilities of the various players and the interaction between offensive and defensive parts of the system[55].

Apart from constraints created by setting up a global strike capability making the command network reactive, another problem is related to the nature of the intelligence obtained about the results of strikes. As we have seen, knowledge about the physical situation of the objective alone (e.g. the weapon has destroyed a building) is not sufficient to qualify the effectiveness of the strike and therefore to plan any further actions. Access to information that are useful for estimating the real effect of a strike requires the use of a very wide range of tools including a variety of sensors (for example intrusive and/or deployed *in situ)*, and also the use of human intelligence. In this respect, it appears difficult to obtain an immediate or even fast response to the question of effective neutralization. Thus, there will be a delay in the timing of different operations although these operations could be carried out in parallel to achieve the same objective. In other words, a prompt strike may be desirable due to the nature of the objective, but whatever happens, it will form part of a longer cycle including planning,

[55] A priori, pure and simple merging of two systems into a single architecture would be necessary to take advantage of interactions between the two capacities. Technically, this can be very difficult in that it increases the number of connected and managed systems.

preparation and post action analysis including the use of a range of different (complementary) means.

Reactivity of the intelligence, although necessary, is not sufficient for making prompt strategic strikes function. It must also be capable of identifying an objective and providing weapons systems with precise information about its position and situation. A widening of the range of available sensors also appears necessary to satisfy this need. At the moment, available tools appear suitable for some targets provided that they are not too mobile – or at least provided that they remain in a single position for a few minutes, which is the case for missile launchers – and that they are neither camouflaged nor protected, for example by an air defense system or deeply buried. Apart from the addition of new information collection means, it will be essential to integrate all tools into an integrated system enabling merging of complementary data that could potentially be broadly scattered.

Concerning missiles to be used for the PGS mission, the US Navy and Air Force have been engaged in studies and research on the use of their nuclear means since the middle of the 1990s. Most of these studies have concentrated on the development of conventional warheads and the problem of penetration of hardened targets. In any case, none of these studies recommends massive deployment of conventional strategic means, but rather the development and introduction of limited capacities for carrying out isolated actions on high value targets.

The *Enhanced Effectiveness* (E2) program was launched by the US Navy in 2003 and is designed to develop a new head for the Trident-II D missile with a range of about 7 500 km, with an improved precision due to the use of a GPS system designed to readjust the path of the warhead during the extra-atmospheric phase[56]**.** This program would result in vehicles capable of carrying conventional heads each transporting a 400 to 500 kg warhead for which the final precision would be about 10 meters[57].

Tests carried out by Lockheed Martin have demonstrated the feasibility of such a system, and the Navy proposed a program to convert Trident missiles (*Conventional Trident Modification*) after the *Quadrennial Defense Review* publication in 2006. Within this framework, each of the 12 SSBNs could be fitted with two modified missiles, each carrying 4 conventional warheads[58]. Due to geographic constraints, in practice only four SSBNs would be in a position to launch their missiles to any target at any given time.

The total cost of the program would be 500 million dollars, with the first deployments being planned as early as 2010. But the 2007 budget requested by the President to launch the program met with strong resistance from both chambers, particularly due to conventional and nuclear weapons being colocated on the same carrier. Financing was

[56] Amy F. Woolf, « Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress », op. cit., p. 8.

[57] Ibid.

[58] « Interim Letter of the National Academies Panel on Prompt Global Strike », May 11th, 2007, p. 2. Note also that two types of heads would be considered, one designed to neutralize unprotected targets and the other to neutralize hardened or deeply buried objectives.

reduced from 120 million to 25 million dollars, leading to a probable two-year slip in the calendar[59]. The Pentagon requested 162 million dollars for Fiscal Year 2008.

Unlike the Navy, the US Air Force has made an attempt to reply to the concern about co-location of nuclear and conventional weapons and consequently has proposed to geographically separate launch sites. The Air Force has intercontinental missiles (Minuteman and Peacekeeper) that it can use as launcher, for which configuration modifications have sometimes been made from nuclear missions to space launches and missile defense tests. According to its analyses, the first deployments of conventional missiles could be made between 2013 and 2015[60].

At the same time, the Air Force has made a commitment to carry out feasibility studies starting in 2003 on the development of the *Common Aero Vehicle* (CAV), that is a maneuvering hypersonic re-entry vehicle. Its speed would be Ma 5, and it would be able to fly independently of its launcher over a distance of about 5 000 km with a final precision of about 3 meters while carrying a warhead of 500 kg[61]. As a glider, the vehicle could also be reprogrammed in flight to hit an expedient target. The program has been allocated about 100 million dollars since its launch, despite reticence by lawmakers about the role and the use of such a system[62]. However, when Congress examined the Pentagon's financing request for 2005, it imposed constraints on the program, in practice making it impossible for it to become the solution for the development of a missile participating in the PGS mission[63]. Although a new research program for modification to *Peacekeepers* for conventional missions was initiated (and financed) in 2006 (the *Conventional Ballistic Missile* (CBM) program), it appears improbable that it will be actually implemented for the PGS project in the short term.

Even if the Navy and the Air Force have offered operational solutions to the political dilemma potentially created by the use of nuclear vectors for conventional purposes, the three programs (CTM, CAV and CBM) could continue to suffer from American political uncertainty about this question. Technically, they no doubt represent the simplest solution to satisfy the need for vectors capable of reaching their targets quickly, and consequently should be the least expensive and fastest to set up.

Nevertheless, ballistic missiles do not represent the only solution to this question. The development of a hypersonic cruise missile engaged in an experimental framework by forces and NASA in the 1990s[64], could provide an alternative but undoubtedly in the long term. Such a system could be deployed on an airborne platform or a ship and reach a target at a distance of several hundred kilometers in a few minutes. This solution

[59] Amy F. Woolf, « Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress », op. cit., p. 15.

[60] Ibid, p. 11.

[61] Ibid, p. 12.

[62] The question of ambiguity in launching ballistic missiles from the continental United States appears to have been at the heart of the concern by the Chambers.

[63] Amy F. Woolf, « Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress », op. cit., p. 14.

[64] The X-43, flight tested in 2004, can achieve a maximum speed of Ma 10. See Noah Shachtman, « Hypersonic Cruise Missile: America's New Global Strie Weapon », *Popular Mechanics*, January 2007 issue.

solves the ambiguity problem of a ballistic missile launch, however launchers would have to be positioned close to the target area[65].

The development of long range cruise missiles or stealthy, weaponized, unmanned platforms could also satisfy the concerns arising from the use of ballistic missiles for global and reactive conventional strikes. In this matter, as emphasized by the *Defense Science Board*, technical options could be considered[66] but their cost and development time make them incompatible with the development of a first capacity in the short term.

Similarly, the use of orbital platforms carrying heads capable of striking the surface could be envisaged. However, such a solution would require the deployment of a complete constellation to be able to maintain a global nature to the strikes[67]. Technically speaking, it is expensive, difficult to implement and introduces inherent risks when a technical failure occurs in the platform. Politically, it could be the source of difficult debates for the United States (more than conventionalization of nuclear carrying systems). Furthermore, it does not have any operational advantage over a land or sea component. Therefore, it appears fairly unlikely that American decision makers will finance its development, and even less likely that they will finance its production.

Finally, even if it only introduces minor technical difficulties, the development of vectors designed to perform the conventional global strike missions is made particularly difficult by political uncertainties that threaten the use of nuclear vectors for this type of mission. *On the contrary*, the development of new systems (particularly cruise missiles) for which *a priori* this difficulty does not exist, will probably be long and expensive.

Thus, in order to quickly materialize the strategic conventional strike capacity, American leaders need to find a means of solving this paradox. Several technical and political solutions could be considered for this purpose, that we will describe later.

1.1.3 – Possible international cooperations and deployments

One of the specific features of the new triad is related to the need to integrate national contributions and foreign capacities. Although this seems obvious for missile defense, particularly to increase the coverage provided by adding sensors and interceptors in regions fairly close to possible threats, the need to have local installations for offensive weapons is just as important.

Considering offensive strikes as a complete system, and even if weapons could be located in other countries, the complete processing system will need sensors that have to be close to the target. Furthermore, antimissile defense command and control systems and the offensive pillar of the new triad will have to be merged (to some extent) to enable the coordinated use of all available systems, and in practice the result will be that the arrival of partners within the *Missile Defense* system would be equivalent to integrating them into a coherent system including these two conventional components.

[65] Amy F. Woolf, « Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress », op. cit., p. 24.

[66] Defense Science Board Task Force, « Future Strategic Strike Forces », op. cit., Chapter 1, p. 9.

[67] Todd C. Shull, « Conventional Prompt Global Strike: Valuable Military Option or Threat to Global Stability », op. cit., p. 56.

Considering missiles, some choices can reinforce this situation. In particular, if solutions based on long-range or fast cruise missiles are selected, these missiles should be integrated onto surface ships or submarines, the former being designed to be fitted with interceptors intended for antimissile defense. Similarly, the use of intermediate range ballistic missiles[68] (less than 5 500 km) would oblige the United States to deploy missiles outside its own territory.

The main cooperations initiated by the United States at the moment exclusively concern missile defense. It appears to be important to make a distinction between two types of relations in this field:

- Direct extensions of the American system apply to countries that agree to host means on their own land under American responsibility. These cases relate to theatre systems (that may be installed temporarily or more permanently) or elements belonging to US homeland missile defense. In Europe, for example negotiations initiated with the Czech republic and Poland relate to a tracking radar and a site for housing interceptors that should be directly integrated into the American command system from 2012. Other European countries already host US early warning radars (United Kingdom and Denmark[69]) that are currently being modernized and included in the network. There are other theater systems in Asia, in addition to these permanent deployments. Thus, Japan hosts both PAC-3 batteries under the control of American forces, and also a naval component integrated into the VIIth fleet and an American flight path mapping radar[70]. Similarly, South Korea is hosting a set of PAC-3 systems for the protection of American forces based on its territory[71].
- Coordination of national means with the American system for some countries that already have or are developing antimissile defenses on their own or in cooperation with the United States. The final integration level depends on many operational, political and technical factors. Firstly, the desire of the involved countries to obtain US MD coverage in addition to that provided by their own systems is decisive. A country that wishes to obtain American warning data would not *a priori* necessarily have its own system integrated into the US C2 network. At the moment, Israel appears to have such access without there being any genuine common planning for the use of interceptors. India might want to obtain the same advantages, although it appears probable that the United States would want to increase coordination between the two defense networks so as to improve Asian coverage of their own system[72]. Other countries, and particularly Japan, have chosen progressive integration of their antimissile defense within the United States defense system. In

[68] This solution has already been mentioned to solve the ambiguity related to the use of long range means with a nuclear connotation. See Amy F. Woolf, « Conventional Warheads for Long-Range Ballistic Missiles: Background and Issues for Congress », op. cit., p. 25.

[69] G. Schlumberger & B. Gruselle, « Le risque balistique : causes et conséquences d'un déploiement américain de la défense antimissile en Europe » (Ballistic risk: causes and consequences of American deployment of antimissile defense in Europe), *FRS Notes,* April 13 2007, p. 4.

[70] B. Gruselle, « L'accélération du programme japonais de défense antimissile » (Acceleration of the Japanese antimissile defense program), *FRS Notes,* January 25 2007, p. 1.

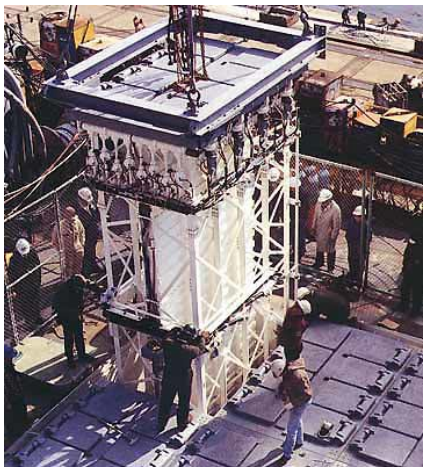
[71] B. Gruselle, « Développement et rôle des défenses antimissiles en Asie » (Development and role of antimissile defenses in Asia), *Research and Documents,* June 2 2006, p. 40.

[72] B. Gruselle, « Missiles et défenses antimissiles en Inde » (Missiles and antimissile defense systems in India), ongoung study for the CEA, p. 33.

practice, this orientation results in exchanging and eventually merging data from warning means, and operational coordination of commitments. Some countries or organizations that have or are developing systems, have initiated studies or discussions with Washington on the technical and operational organization. For example this is the case for the Atlantic Alliance, and for Australia that has a transhorizon warning network[73]. Finally, note the special case of countries that, for political reasons, are reticent to engage their own means in an operational coordination with the United States. South Korea is in this situation, now that it is modernizing its air defense that could theoretically enable it to have an embryo capacity for theater defense[74].

The existence of large technical and operational naval cooperations further reinforces the range of American options by which Washington hopes to extend coordination of antimissile means and eventually the two conventional components of its triad. Several countries have worked with Washington to acquire or co-develop ships equipped with the AEGIS system, namely Spain, Japan, Norway, Australia and South Korea[75]. All these ships can operate under a unified command system enabling coordinated engagements (*Cooperative Engagement Capability)* and can accommodate standard launch tubes capable of holding all missiles for naval use. A Spanish ship participated in the test of the American antimissile defense system that took place in June 2007, in particular demonstrating the interconnectivity of command and communication systems[76]. Even if the possession of AEGIS-equipped ships does not necessarily involve immediate integration into the future triad command network, it is impossible to ignore the fact that operation of ships on which this system is fitted will eventually be based on the existence of a strong link between the naval loop C2 and the system.

Image 4: Mk-41 *Vertical Launch System*) capable of holding a range of offensive and defensive missiles



[73] Brendan Nicholson, « Australia's Key Role in Missile Defense », *The Age*, January 7th, 2006.

[74] B. Gruselle, « Développement et rôle des défenses antimissiles en Asie »(Development and role of antimissile defense systems in Asia), op. cit., p. 35.

[75] M. Picard, « De la composante navale de la *Missile Defense* » (about the naval component of Missile Defense), op. cit., p. 7.

[76] « Aegis BMDS Successfully Destroys Separating Ballistic Missile During Test », *Defense Talk*, June 25th, 2007.

Due to all the cooperations initiated since the beginning of the decade, the United States could have a first world-wide antimissile defense network by 2015 based on land-based systems directly integrated into MD and on mobile systems, particularly maritime-based systems, interfaced within a global C2. It could be extended in phases to other countries and organizations that are now investing in the definition of their own system. In particular, NATO, which has commissioned a feasibility study on missile defense, will have to define how this future system will be articulated with the US MD. Apart from technical aspects, it will have to decide the extent to which its own command system should be merged with the United States one and how the Alliance would be involved in the process of defining rules of engagements and planning, knowing that interception decisions would probably be strongly automated.

The second question raised by the integration of third party countries into the US missile defense system concerns their political and operational involvement in operation of a wider network including offensive means. The very strong complementarity that exists between defense and attack missions will call for a single operational command network. Regardless of the form that it might take (either a development of the *Missile Defense* C2 or a new system integrating C2BMC), cooperating countries will be asked to participate. Some countries might want to extend defensive coordination to offensive means, for operational efficiency reasons. Seen from the United States, this decision would have the merit of broadening the range of possible options, for example to carry out counter-proliferation type operations. However, a corollary would be that the integrated countries would have to be associated with the planning, preparation and action phases, potentially limiting the use of their own means[77]. It would therefore appear essential to seek a compromise on this subject, for example the set up of international military elements responsible for planning. Washington will undoubtedly attempt to minimize the influence of its allies for the part concerning the use of offensive systems, but will have to compromise due to the global and continuous nature of these two pillars of the triad.

[77] On this question, the analogy with possession and use of the cruise missiles is interesting. For example see B. Gruselle, « L'utilisation des missiles de croisière conventionnels : un concept en mutation » (The use of conventional cruise missiles; a change in concept), FRS Notes, February 27 2006, p. 5.

NATO

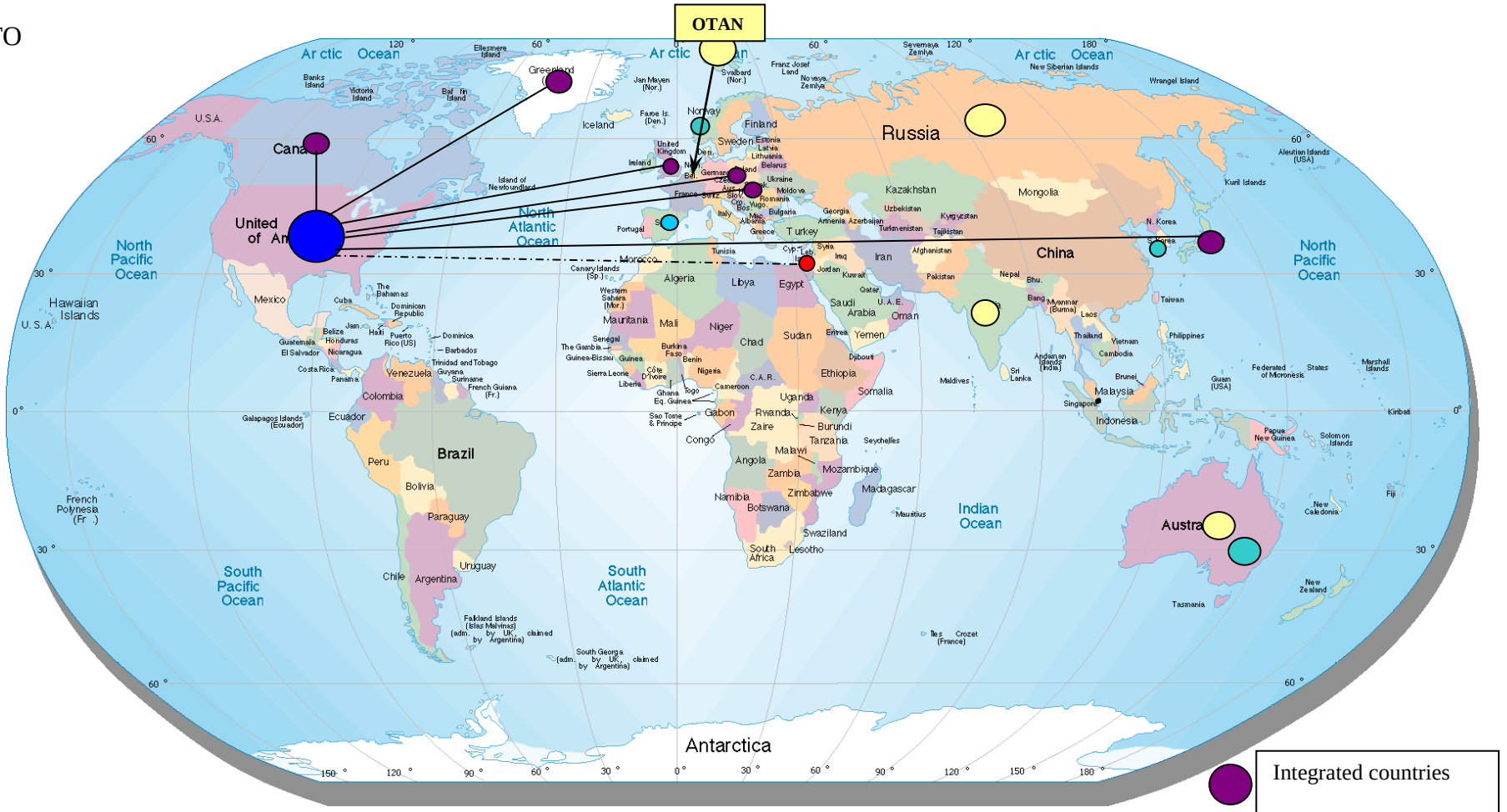


Figure 4: Map of operations in the MD field

1.2 – Weapon control systems and new triad

1.2.1 – Legal constraints applicable to the new triad

Now that its obligations under the ABM treaty in 2001 have disappeared, Washington has a lot of room for maneuver for the development, production, deployment and use of missile defense. There are no legal constraints that have a serious influence at the moment on development of the defensive component of the new triad.

But this is not the case for the conventional offensive part. In a way, at first sight, the legal and political constraints that affect the PGS concept will control American technical options, like the ABM treaty did before the withdrawal in 2001[78].

Moreover, these constraints go beyond the framework of international treaties alone, in that firing of ballistic missiles raises safety problems for overflown populations and air and sea traffic. However, the real risk should not be overestimated, knowing that the problem essentially concerns sea and air traffic, and that notification obligations can be cleared in the case of national need[79]. These constraints would limit reactivity of the action if they were completely applied, to the extent that they would make the concept of prompt strikes partially ineffective. The risk to civilians due to falling propulsion stages should no doubt be put into perspective, considering the importance of the targeted objectives.

The deployment of conventional systems designed to fulfill the prompt global strikes mission (PGS) could also be limited by international or bilateral treaties that the United States has signed.

In particular, the START treaty creates several limits for the deployment of conventional missiles derived from intercontinental missiles. Although in theory, it does not prevent the development of conventional warheads for intercontinental missiles[80], it creates limitation to the number and type of ballistic missiles the US can deploy:

- The deployment of ballistic missiles with a range of more than 600 km on non-submarine naval platforms is prohibited by article V, §18.a in the treaty[81]. Thus, projects to deploy intermediate range missiles (range between 3 000 and 5 500 km) on surface ships cannot be completed at the moment. However, note that such projects would require a development period that *a priori* would go beyond the end of the treaty.
- The total number of intercontinental missiles authorized by article II in the treaty remains constant regardless of the type of warhead carried by these missiles. In other words, although conversions can be envisaged, the addition of new missiles (Trident or Minuteman) into the American arsenal is practically prohibited by the treaty.

[78] Todd C. Shull, « Conventional Prompt Global Strike: Valuable Military Option or Threat to Global Stability », op. cit., p. 59.

[79] Ibid, p. 65.

[80] Anatoli Diakov & Eugene Miasnikov, « RE-START: The need for a New US-Russian Strategic Arms Treaty », Arms Control Association, September 2006.

[81] Treaty between the United States of America and The Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms, July 31st, 1991 (START treaty).

- The deployment of land(silo)-based missiles on space launch or test sites is limited to 20 systems, only 10 of which are deployed in silos (Article IV, §4.b and 4.c). Furthermore, section 11 in the same article obliges parties to position test sites or space launch sites more than 100 km from intercontinental missile launch sites.

Thus, the final result is that Washington commitments in the framework of the START treaty do not form an extremely restricted constraint for the strategic conventional strikes program if it is to be a limited capacity. The fact that it will expire in 2009 and that the United States does not appear ready to renew it under its current form, even though it might be possible to negotiate a new agreement[82], will enable Washington to develop its program freely, knowing that this should not lead to any deployment before the next decade, apart from the conversion of submarine-launched missiles or intercontinental missiles into missiles launched from silos.

On the other hand, it should be emphasized that the deployment of intercontinental missiles modified into missiles launched from silos raises a difficulty if it occurs before this date. The United States could consider using Cap Canaveral and Vandenberg as deployment sites, to prevent confusion between nuclear and conventional means[83]. But the START treaty considers that these two sites are dedicated to space launches, and they should not be used for deployment of intercontinental ballistic missiles (ICBM). For example, Vandenberg already contains silos, and the construction of new silos is strongly limited. The *Defense Science Board* suggests that the Air Force should convert up to 50 conventional mission Peacekeepers , which is well above the threshold fixed by START[84].

Two other mechanisms affect American options for deployment of some systems that could control the PGS mission or their use:

- The firing pre-notification protocol signed in 1988 in the framework of the START treaty obliges party States to notify each other about firing of a strategic missile, 24 hours in advance[85]. The information that have to be provided includes the launch date and time as well firing and impact zones. This agreement does not include a waiver depending on the launch type. Therefore it appears very restrictive for the use of conventional strategic strike capacities because it eliminates the reactivity necessary for them to be effective. A firing time period of 24 hours appears completely unrealistic for neutralizing time sensitive targets. Moreover, it should be emphasized that this protocol, even if it is initially attached to the START signature, is indeterminate in duration and therefore will not expire when the treaty does[86].

[82] See US, Russia To Ink Accord on Strategic Weapons Talks », Defense Talk, July 3rd, 2007. We will consider this question further later on.

[83] Todd C. Shull, « Conventional Prompt Global Strike: Valuable Military Option or Threat to Global Stability », op. cit., p. 67.

[84] Defense Science Board Task Force, « Future Strategic Strike Forces », Office of the Secretary of Defense, op. cit., Chapter 1, pp. 8-9.

[85] Agreement Between the United States of America and the Union of Soviet Socialist Republics on Notification of Launches of Intercontinental Ballistic Missiles and Submarine-Launched Ballistic Missiles, May 31st, 1988. Article 1.

[86] Todd C. Shull, « Conventional Prompt Global Strike: Valuable Military Option or Threat to Global Stability », op. cit., p. 68.

- The treaty on Space exploration could form a severe restriction to the deployment of strike capacities on space platforms[87]. This is more a question of interpretation than an explicit constraint. Article IV interdict only the deployment of weapons of mass destruction. The United States' interpretation of their obligations in terms of the use of space for military purposes does not expressly affect deployment of weapons, even if this use is extensive. On the other hand, the guidelines that appear in the United States space policy document published in 2006 are more moderate on this question[88]. However, Washington has not renounced the possibility of carrying out research and development work on space weapons systems, but as we have seen the operational advantages provided by them are fairly negligible compared with land means and their cost is higher.

Finally, commitments made for the missile technologies control regime (MTCR) may also influence cooperations that Washington might wish to set up for conventional components of the new triad. According to the directives of the regime, the United States cannot transfer or sell missiles with a range of more than 300 km and a warhead of 500 kg to a third party country. Although it seems fairly improbable that Washington would provide its allies (except for British) with this category of offensive missiles, the transfer of exoatmospheric antimissile interceptors could be considered as violating these commitments. Once again, the question is more about how the US Administration will interpret the MTCR documents, rather than the genuinely proliferating nature of such transfers. But note for example, that the projected sale by Israel of Arrow-II systems to India had raised important objections within the Administration about the United States' commitments in the regime and its non-proliferation policy[89]. Thus, although it seems unlikely that this type of consideration would block cooperation with close allies, it could have a greater influence on cooperation with countries for which compliance with non-proliferation standards is more problematic, for example Gulf States or India. Furthermore, a future administration less determined about the need to extend the antimissile defense network than the one actually in charge, could look at this question more closely and take a more cautious stance on missile defense cooperations.

Eventually, legal obligations that might influence the American *Prompt Global Strikes* project are relatively not very restrictive considering the possible deployment calendar and the administration's stated wishes (see table No. 2). However, some elements could limit the use and deployment of means. In the short term, the START treaty forbids the deployment of intercontinental missiles with conventional warheads on some envisaged sites (Vandenberg and Cap Canaveral). In the longer term, the pre-notification agreement signed with the USSR in 1988 would affect the utility of the PGS project, in other words the ability to strike time sensitive targets. To a lesser extent, American commitments under the MTCR might hinder some cooperations, although it would not appear to be capable of preventing them.

[87] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, January 27th, 1967. http://www.unoosa.org/pdf/publications/STSPACE11F.pdf

[88] B. Gruselle, « La défense antimissile dans l'Espace : l'ultime frontière ? » (Antimissile defense in space; the final frontier?), UNIDIR, Disarmament Forum 2007 No. 1, p. 58

[89] K. Alan Krondstadt, « India-US Relations », CRS Issue Brief for Congress, Congressional Research Service, February 9th, 2006, p. 10.

	START	Pre-notification protocol	Treaty on Extra-atmospheric space	MTCR
Antimissile defense	No influence	No influence	No influence	Medium influence
Converted ICBM (Peacekeeper)	Strong influence in the short term	Strong influence	No influence	No influence
Converted SLBM (Trident)	No influence	Strong influence	No influence	No influence
Orbital means	No influence	No influence	Medium influence	No influence
Cruise missile (hypersonic)	No influence	No influence	No influence	No influence
Intermediate range ballistic missiles	Strong influence in the short term	NC	No influence	No influence

Table No. 2: INFLUENCE OF TREATIES AND AMERICAN COMMITMENTS ON TECHNICAL AND OPERATIONAL SOLUTIONS FOR THE NEW TRIAD

1.2.2 – Ambiguity of the conversion of strategic missiles and early warning

After considering elements developed in the previous section, it appears that the most critical question that still hangs over the American PGS project relates to conversion of some strategic missiles carrying nuclear weapons for conventional missions. Another nuclear-armed country might consider firing of such systems as the trigger for a nuclear strike justifying a reprisal against the United States and/or its allies. This argument has been put forward by the Senate and Chamber commissions during the examination of budget requests made by the administration for the development of new conventional warheads or system conversion[90].

However, several external factors might reduce the risk of false interpretation of a firing made within the framework of PGSs:

- The international situation: except in a crisis situation or a war, firing an isolated American missile might well put nuclear weapons of other countries into alert, but it would appear to be unlikely to trigger a reprisal, particularly because of existing crisis communication means (red phone). For example, it will be remembered that these security measures did work when the Russian detection system confused the firing of a Norwegian sound rocket with the launching of a submarine-fired missile in 1994. This type of scenario would undoubtedly be more worrisome in the case of

[90] See section 1.1.2.

an international crisis or a war. But once again, the specific circumstances would have a large influence on the reactions, if any, and communication channels would remain a plausible mean of preventing escalation.

- The actual detection capacities (early warning) of the involved States: while the United States now has a complete and efficient early warning system, other nuclear countries undoubtedly do not have the same level of performances. Now, the possibility for a country to effectively detect launching of an American missile and in particular to evaluate its path and the point of impact, appears to be one of the elements on which a possible reprisal decision will be made. Thus in most cases, assuming that a detection occurs, there are elements that can remove the uncertainty about the geographic location of the target and consequently significantly limit the risk of the use to nuclear weapons by States that do have early warning and/or tracking capabilities.

With regard to this point, Russia appears to be the country most likely to detect firing of a ballistic missile, and in the case of a false interpretation, to use its own nuclear assets against CONUS. The Russian early warning and tracking network, even if it has been facing numerous problems since the fall of the Soviet Union, is based on land systems (transhorizon and long range) and space systems that should be capable of monitoring most possible firing locations.

However, despite the coverage that the system set up by Russia since the 1970s should theoretically provide, the real performances and its capacity to detect ballistic missile firings in practice are limited by several technical and operational factors[91]:

- The Russian warning system is based almost entirely on a radar network, some of these radar systems are located outside Russia, and this network covers approaches to the country. It was originally designed to perform two functions; to provide data necessary for operation of Moscow's missile defense and to enable detection of a massive nuclear attack[92]. The Russian early warning was developed to satisfy the latter function, and to enable the detection of an ICBM firing from the continental United States. Thus, this network has only a limited capacity for the detection of missile fired from submarine platforms, to the extent that the Soviet command considered that such actions would be in case of reprisal rather than a first use[93]. Even if some radar and satellite means are capable of monitoring the northern part of the Atlantic Ocean and some parts of the Pacific, the Indian Ocean or the Mediterranean Sea, not all potential zones that could be used for missiles launches are covered[94]. Similarly, the constellation of early warning satellites in high orbit is incapable of detecting launches from the entire US, although this capacity should be complete when the new Cosmos systems are launched[95].

[91] Pavel Podvig, « History and the Current Status of the Russian Early-Warning System », *Science and Global Security*, 10:21-60, February 6th, 2002, p. 26.

[92] Ibid.

[93] Ibid, p. 42.

[94] Ibid, p. 28.

[95] Pavel Podvig, « Russia and the Prompt Global Strike Plan », *PONARS Policy Memo* No. 417, December 2006, p. 3.

- The deployment of radar systems outside Russia (Kazakhstan, Azerbaijan, Ukraine, Belarus) and the cost of a possible replacement may modify the current coverage. Already, the dismantling in 1998 of the early warning system deployed in Skundra (covering the North Atlantic) at the request of the Latvian authorities, opened a break in the North-West part of the Russian network that has not yet been filled by any other means[96]. Furthermore, Russia's priority at the moment appears to be to reinforce the Moscow's missile defense detection system, rather than to modernize and maintain its early warning capacities. The construction of a Volga type radar in Gantsevichi (Belarus), to replace the Skundra Daryal-U[97] is consistent with such logic.

Considering the real situation of the Russian warning system, the risk of a conventional system launched from an ocean platform being confused with a nuclear attack appears relatively small, to the extent that means available to Moscow appear capable of differentiating a path aimed at its territory from firing aimed at a different geographic zone[98]. However, even if this risk is small, it is nevertheless real particularly for missiles aimed at targets close to Russia, and its consequences are potentially catastrophic[99]. The reinforcement of Russian early warning and detection means, with or without the cooperation of the United States, could reduce the risk of an erroneous interpretation by Russians. By improving the tracking performances of its network, Russia could quickly eliminate any ambiguities about some possible trajectories. Similarly, setting up a system for sharing information originating from Russia and the United States warning detection networks could reduce risks inherent to the deployment of ballistic components of the PGS program. However, such an agreement signed in 1998 for the construction of a *Joint Data Exchange Center* (JDEC) has not led to anything in practice, and the principle for setting up such a tool now seems to have been abandoned by the two partners, for political as well as practical reasons.

At first sight, the launch of intercontinental ballistic missiles from the CONUS would appear more problematic, because it would probably be detected by the Russian early warning network. In such a case, the risk is as much due to possible co-location of nuclear and conventional means as to the Russian uncertainty about the nature of the attacking missile. Even if measures can be envisaged to physically separate the two types of missiles, the problem of the credibility of such an initiative as seen by Moscow still arises. In the lack of any measures designed to assure transparency (for example on-site inspections) or transmission of characteristics of warheads that the Russian could use to practically (and verifiably)[100] distinguish elements specific to conventional systems, any firing from the continental United States is likely to cause a Russian

[96] Pavel Podvig, « History and the Current Status of the Russian Early-Warning System », op. cit., pp. 30-31.

[97] The detection range of the Volga is not as good as the Daryal, see « Russian Strategic Nuclear Forces », edited by Pavel Podvig, The MIT Press, 2001, pp. 425-426.

[98] Pavel Podvig, « Russia and the Prompt Global Strike Plan », op. cit., p. 4.

[99] The potentially most catastrophic scenario would be that the firing is not detected and that the Russian warning system does not perceive the missile until its final phase, that it would be interpreted as the precursor of a massive strike and that Russian command decides to respond by a massive strike. See Todd C. Shull, « Conventional Prompt Global Strike: Valuable Military Option or Threat to Global Stability », op. cit., pp. 121-122.

[100] For example by the development of particular infrared or radar signatures.

reaction[101]. Its nature and its intensity depend both on existing political conditions, in other words the state of relations between the two countries and the situation of the Russian C2 as affected by Moscow's nuclear posture and the structure of its strategic forces.

For China, which only possesses limited antimissile capacities, the detection of a launch could be the source of confusion and possibly incorrect interpretations. At the present time, Beijing only has one early warning radar constructed in the 1970s[102], for which the operational situation is not known, but that might be capable of detecting the firing and path of a missile launched from the continental United States. Due to the lack of complete coverage of the country approaches and the existence of a firing control radar network related to the point defense system[103], the problem lies essentially with the possibility of a missile being detected during its trajectory and wrongly evaluated as targeting mainland China. An improvement to the Chinese tracking capability would then be a factor to reduce the risk while facilitating more precise detections.

However, it should be emphasized that this danger, although it does exist, is relatively small in the present situation in which the Chinese detection capacity is probably limited to launches taking place within the North-East Asian region. Furthermore, the nuclear posture of Beijing and its force structure significantly limit the risk of China using weapons in such a situation, except after a qualified nuclear attack against its soil.

Although the development of American conventional strategic rapid strike capabilities could genuinely introduce the risk of a ballistic missile firing being incorrectly interpreted by Russia and China, this risk actually appears to be relatively low. Apart from the fact that detection capacities of these two countries would *a priori* be such that the United States could choose appropriate trajectories to eliminate some ambiguities, the planned methods for using PGS capacities provide an additional safeguard. The few ballistic missiles adapted for conventional strike missions should only be used in a very limited manner and in numbers incoherent with a nuclear first strike.

However, for political and operational reasons, these two countries could have a very hostile attitude towards setting up of the American rapid strike capacity, even if satisfactory transparency measures were set up. The addition of these systems into the American conventional arsenal contributes to strengthening the military power of the United States that Moscow and Beijing both see as being contrary to their interests. In this logic, the two countries could employ whatever means are available to them to hinder the American project. Specifically, particularly for Russia, this policy might result in a hold on change or placement of instruments that could limit the risks of an incorrect interpretation of a launch. Obviously, this assumes that Washington is ready to discuss these measures with the two capitals, which might for example be possible after the 2008 elections.

Moscow's fierce opposition to the European extension of the *Missile Defense* (apparently seen as being interference on its zone of influence but also as a reinfor-

[101] Todd C. Shull, « Conventional Prompt Global Strike: Valuable Military Option or Threat to Global Stability », op. cit., p. 123.

[102] http://www.sinodefence.com/army/surfacetoairmissile/missiledefence.asp

[103] B. Gruselle, « Développement et rôle des défenses antimissiles en Asie » (Development and role of antimissile systems in Asia), op. cit., pp. 50-51.

cement of US power in Europe at its expense) is a good illustration of methods that could be chosen by Russia to oppose it[104]. Apart from threats of withdrawal from some disarmament or armament control treaties, or threats against countries cooperating with the United States, Russia is increasing cooperation proposals probably hoping to slow or even prevent the American project from becoming mature. Finally, Russian (and Chinese) leaders use the American antimissile defense project to justify modernization of their own strategic nuclear capacities and a very aggressive armament and military cooperation policy.

If Washington finally decides to negotiate transparency measures on its conventional strategic capacity with Moscow and to accompany its deployment and use with measures aimed at reducing the ambiguity of PGS use, the question arises of knowing the extent to which Russian leaders will practice a blocking policy. In particular, it would be worrying if Russian obstruction leads to a deployment of US systems without any (bilateral) safeguard system being set up especially if Washington is led to abandon the 1988 notification system to escape the constraints that this system applies on the use of its capacities.

1.2.3 – Rethinking the supervision of the conventional strategic strikes program

At the moment, there are very few constraints affecting American programs related to the new triad, and particularly very few constraints affecting the prompt conventional strategic strike capacity. Therefore, at first sight, it would appear in Washington's interest to continue its program only considering technical and operational questions related to its development, deployment and use.

But the existence of a real risk of false interpretation of a launch by Russia and to a lesser extent by China would require American leaders to implement specific measures. In particular, Washington would need to redefine its perception of conditions for use of this type of means, reconciling military constraints (prompt reaction, surprise) and potential risks related to use.

As we have seen, there is a severe risk of Russia using a discussion on supervision measures to delay deployment of the PGS capacity as envisaged by the United States, or even to open up the discussion on questions that are not directly related to the new triad, for example such as militarization of Space. If Washington chooses to initiate a long negotiation with Moscow about the supervision of the program and the use of missiles, it should take unilateral measures at the same time to limit risks related to use[105].

However, although this double approach is necessary, it does not appear to be sufficient, because the problem is equally related to the nature of American capacities and the situation of the Russian nuclear means. Russia maintaining the capacity to strike following a warning is also in question. If the United States envisages increasing the size of its conventional ballistic arsenal, for example to perform operational support missions (in other words for more routine and/or more massive use), Russia's nuclear

[104] Isabelle Facon and Bruno Tertrais, « Une course aux armements imaginaire » (An imaginary arms race), *Le Figaro*, June 6 2007.

[105] We will discuss measures and their organization in a later paragraph.

posture could become extremely problematic in terms of security[106]. In this framework, the conclusion of a bilateral agreement aiming at progressively reducing warning levels of the two nuclear arsenals would become objectively necessary.

The approach of the Chinese case creates problems of another nature, particularly because some circumstances could lead to the use of PGS capacities against its interests, or directly against its own forces or against the forces of one of its allies. In the event of a conflict in Taiwan Strait, the use of ballistic missiles in counter-force operations alongside with other offensive or defensive conventional means, could be useful to defeat the arsenal of Chinese tactical missiles. This competitive situation between the two States significantly limits the possibility of reaching transparency agreements about conventional strategic capacities or their use. Washington could be satisfied with unilateral measures to reduce the risk of spurious detection due to China's nuclear posture and its limited warning capacities. If this situation changes (as some elements suggest that it will)[107], the need to initiate a negotiation on transparency measures could become more urgent.

Setting up a system designed to control deployment and then the use of the conventional offensive part of the new triad should finally lead to a progressive approach based on unilateral short-term measures taken by the United States to reduce the risks of an misinterpretation of a launch by Russia and to a lesser extent by China, and long-term efforts on a bilateral or even multilateral level to increase the transparency level of this arsenal with regard to Russia. In this effort, the United States should be able to reconcile its operational constraints (and if applicable take account of a change to objectives of this capacity) and political difficulties inherent to the nature of its relations with Russia.

The change of the posture and military and strategic capacities of China and Russia should also be taken into account, together with the state of their relation with Washington. Beijing and Moscow have engaged modernization efforts on their conventional and nuclear means, with Moscow basing its security more and more patently on its strategic capacities. Degradation of relations between Russia and the West and particularly with the United States, particularly striking since the beginning of the year 2007 and specifically on the matter of deployment of European antimissile defense sites[108], reduces the chances of success of an American effort to negotiate transparency measures.

2 – Consequences of the new triad on strategic situations

The development and ongoing or future deployments of offensive or defensive elements forming part of the conventional part of the new triad are perceived in Beijing and Moscow as being symbols of American military hegemony, and also its capacity to progressively extend its woven alliance and strategic cooperation, even if they do not threaten the Chinese and Russian powers directly.

[106] Todd C. Shull, « Conventional Prompt Global Strike: Valuable Military Option or Threat to Global Stability », op. cit., pp. 119.

[107] Ibid, p. 120.

[108] Thomas Bauer, « Missile Defense: The Debate in Germany », FRS, Points of View, June 25 2007, p. 3.

Image 5 : The new Chinese intermediate range DF-25 missile (source sinodefense)

Investments made by Moscow and Beijing for their own military systems could at first sight be the response of these two states to changes to American military strategy and closer relations between the United States and its regional allies. Thus China, observing the Indian-American reconciliation and the change in the Japanese approach to defense questions, might think it is necessary to acquire more means to resist American's capacity for action in its immediate environment.

However, several elements contradict the belief that the appearance of the new triad is the sole factor affecting Chinese or Russian intentions:

- For the Chinese, efforts in terms of ballistic missiles, cruise missiles and diversification of firing platforms (for example in the naval field) were initiated in 1980s and therefore well before the start of the *Missile Defense program*.
- The Russian attitude is not limited to a severe criticism of the American project to extend antimissile defense to Europe, for example including the question of the future status of Kosovo or denunciation of the treaty on conventional forces in Europe. More prosaically, Moscow appears to want to reacquire its status as a great power capable of facing down the United States and, for some of the Russian political class, correct the weakness inherited from the collapse of the Soviet Union[109]. In this respect, during the last few years, Russia has not been concerned about the existence of antimissile defense sites in Denmark or England even though they are directly related to the American command system, are currently being modernized, and are probably even more capable of having a "nuisance" capacity against Russian strategic forces[110].

To get a better idea of the possible consequences of setting up the two conventional components of the new triad, it is important to determine their real effects on present and future strategic military capacities in China and Russia.

It also seems useful to determine the extent to which effective deployment of the new triad might affect countries holding or developing ballistic capacities or weapons of mass destruction. The deterrent nature of these means described in the reference documents (NPR and QDR), deserves to be examined more closely, considering the motivations of the countries concerned in continuing their efforts.

Finally, considering these elements and elements mentioned earlier, what are the technical or political measures that might be considered to reduce the potential effect of

[109] Ibid, p. 4.

[110] Nikolai Sokov, « The Russian Arms Control Agenda After SORT », *Arms Control Today*, April 2003.

the new triad on the main international equilibriums. In order to satisfy this question, it seems necessary firstly to draw up a list of these measures but also to determine firstly their advantages and disadvantages, and secondly the practical conditions under which they could be effectively implemented.

2.1 – Towards a new competition with Russia

Moscow's reactions to the announcement of a possible agreement between Washington, Warsaw and Prague on antimissile defense were extremely sharp, undoubtedly for political reasons because of the sentiment of the Russian leaders that deployment of facilities in central Europe illustrates the existence of a sudden unbalance between the capacity of the Russian strategic arsenal and the transformation of the capacity of the United States' arsenal.

Nevertheless, despite the crisis that followed the collapse of the Soviet block, Russian strategic forces have undertaken the work necessary to obtain a renewed capacity based on new systems for which the development was initiated at the beginning of the 1990s. This effort should enable Russia to continue to maintain a nuclear capacity which, even if it is not as large as it was at the time of the Cold War, is nevertheless satisfactory considering catastrophic forecasts made in the 1990s[111].

The ongoing modernization will also enable Russian authorities to transfer an important part of Russia's security to its nuclear forces. In particular, the Kremlin appears to believe that a limited use of these weapons could be considered to respond to conventional aggression aimed at national interests[112]. Thus, to a certain extent, in Russia there has been a reinforcement of the role of nuclear weapons made possible by successful reorganization of strategic forces and the conservation of a smaller but solid core of capabilities based on carrying systems and launch platforms for which the development is practically finalized. Furthermore, a non-negligible part of the Russian arsenal should be mobile, either on submarines or on land transport.

Despite this trend, due to its economic growth permitted essentially to the use of its energy resources and raw materials, Russia has also begun to reinvest in the development of new conventional systems aimed at re-equipping its forces[113]. Although it cannot hope to catch up with the accumulated gap between itself and the United States, Moscow could have a series of modern capacities before the end of the decade, particularly in the field of cruise missiles, antimissile defense or tactical ballistic missiles.

[111] Pavel Podvig, «Russian Strategic Nuclear Forces in the Next Decade», Aspen Institute, 2004. http://www.aspeninstitute.it/icons/imgAspen/pdf/news/n3_05_Podvig_e.pdf

[112] Yury E. Fedorov, « Russia's Strategic Forces: Policy, Evolution and Prospects », Proliferation Papers, Summer 2005, p. 9.

[113] Fred Weir, « Russia's Resurgent Military », *The Christian Science Monitor*, August 17th, 2007.

2.1.1 – A smaller nuclear arsenal but that is now stable after years of crisis

The technical line adopted by Russia to maintain an approximately constant nuclear capacity, although it is slightly lower than before, consists of carrying out two special efforts at the same time:

- ⇨ Extension of the life of missiles and platforms inherited from the Soviet Union. Some of this arsenal deployed in the 1980s could thus be kept until the middle of the next decade.
- ⇨ Development and production of new systems, engaged in the middle of the 1990s, for deployment of a few tens of missiles that should be able to take over as the former are withdrawn.

Thus, Moscow is in a position to limit the quantitative reduction and to quantitatively improve its land, sea and air components, while benefiting from a certain margin for maneuver in terms of the number of nuclear weapons deployed. Some new missiles originally designed for single warheads, could be fitted with multiple warheads, for example as is the case for one of the versions of the TOPOL-M SS-27[114].

Russia now has five types of intercontinental missiles, some of which should be withdrawn from service before the end of the century[115]:

- ➥ The SS-24, with a range of 10 000 kilometers and equipped with 10 MIRV type warheads has been deployed on rails since the middle of the 1980s. Thus, while the silo version was abandoned at the beginning of the decade, Russia has extended the life of this system by a few years so that its replacement on a wheeled vehicle can be deployed. However, for technical reasons, it is unlikely that the extension will make it possible to keep these missiles beyond 2010, due to maintenance costs related to the solid fuel propulsion used on them[116].

Image 6 : The SS-24 should be withdrawn from service not later than 2010

- ➥ The SS-18 deployed in silos, is an 11 000 km range missile carrying 10 MIRVs put in service at the end of the 1970s, and modernized in the 1980s[117]. It is now one of the two pillars of Russia's land strategic force but will be progressively replaced by the SS-27. The life of this liquid propulsion missile may be as long as 2020, and it

[114] « Russian to Refit Strategic Nuclear Missiles With Multiple Warheads — Report », By Mosnews, December 19th, 2006.

[115] http://www.cdi.org/friendlyversion/printversion.cfm?documentID=2967

[116] Pavel Podvig, « Russian Strategic Nuclear Forces in the Next Decade », op. cit. http://www.aspen institute.it/icons/imgAspen/pdf/news/n3_05_Podvig_e.pdf

[117] Ibid.

will thus enable Russia to keep an important part of its nuclear capacities intact until this time.

- The SS-19 also installed in silos, comprises 6 warheads and has a range of 10 000 km. Dismantling of all silos was initially planned for 2005 but has been delayed *sine die*, and the number of missiles is the second pillar, although it has been reduced by thirty. Even if, as for the SS-18, the nature of the missile is *a priori* such that its life can be extended until 2020, it is fairly probable that this missile, that has not been modernized since the end of the 1970s, would be the first to be replaced by the future SS-27.
- Even though the solid propulsion SS-25 is a relatively recent missile (since it was put into service at the end of the 1980s), the maintenance cost of this single warhead 10 500 km range missile could well make it impossible to keep it in service beyond the end of the decade. By then, its replacement by the SS-27 should make it possible to maintain the mobile land component.
- The SS-27, the deployment of which began at the beginning of the decade, is a mobile single warhead missile with an estimated range of about 10 000 km. About forty missiles of this type are now in service in forces and production is continuing at a rate of 5 to 10 per year. A silo version, carrying 10 MIRVs, is probably under development (a test was carried out in May 2007) to enable replacement of the SS-18 and SS-19 missiles[118]. Assuming commissioning starting from 2010 and at a production rate approximately equivalent to the mobile SS-27, about a hundred of these systems could be operational in 2020. It would also appear that a new liquid propulsion missile that would also replace the SS-18 and SS-19 in the 2020-2030 period, would also be under development[119].

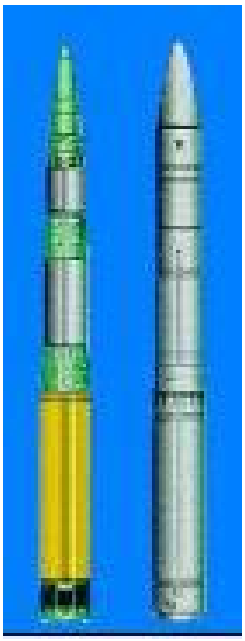


Figure 5 : the SS-25 and SS-27 missiles

Although Russia has about 600 land-based ballistic missiles (and 2 600 warheads), the gradual reduction in existing SS-18s, SS-19s and SS-25s should bring this number down to about 200 in 2012 and 250-300 in 2020, for a thousand nuclear weapons. Although this reduction is significant, it is important to emphasize that this will be modern missiles in high enough number to penetrate any defense system deployed by the United States[120]. Furthermore, everything suggests that the Russian arsenal will be quantitatively stabilized by this date, even if it is very unlikely to increase beyond these values for technical and industrial reasons (particularly because of limited production levels).

The situation for the sea-based component is much more contrasted. The aging of the submarine fleet has a strong influence on Russia's capacity to effectively deploy missiles launched from this type of platform. More than 40 missile launcher submarines have been withdrawn from service since 1990[121]. At the moment, there are 6 or 7

[118] http://www.globalsecurity.org/wmd/world/russia/rs-24.htm

[119] Designers Confirm Renewed Funding for Liquid-Fuel Missile R&D, Open Source Center Analysis, March 20th, 2007.

[120] Pavel Podvig, « Russian Strategic Nuclear Forces in the Next Decade », op. cit. http://www.aspen institute.it/icons/imgAspen/pdf/news/n3_05_Podvig_e.pdf

[121] http://www.cdi.org/friendlyversion/printversion.cfm?documentID=2967

Delta-IV type submarines that form the framework of the Russian naval component and some of the fleet is currently being modernized, together with the SS-N-23 missiles used on it. Thus, after a series of unsuccessful tests in February 2004, the new missile known as Sineva with a range of 8 500 km and equipped with 4 nuclear warheads, could be deployed in future years[122]. Due to this modernization program, the life of Delta-IV class submarines could be extended until beyond 2020[123].

Conversely, construction of new Borey class submarines is more difficult. While development began in the early 1990s, only two submarines were deployed and a third could join the fleet in 2006-2007, which should eventually include 6 submarines in this class. However, no Borey submarine is yet equipped with missiles. The Bulava program (SS-NX-30) that should enable the deployment of a naval version of the TOPOL-M SS-27 with a range of 10 000 km and carrying 6 nuclear warheads, initiated in 1997, suffered a series of failures during the first flight tests carried out in 2006, casting doubt about whether it would actually be put into service before the end of the decade[124].

Therefore in the medium term, Russia should have about ten SSBNs and about a hundred strategic missiles, namely 500 to 600 nuclear warheads. Although this is far from the levels reached during the Cold War period, quantitative and qualitative levels of the sea component and its equivalent the land component, should become sufficient so that Russia does not need to worry about the deployment of antimissile defense capabilities by the United States. However, uncertainties continue to cloud the capacity of Russian design offices to develop the new generation of submarine launched missiles which could have a long term effect on the stability of this component.

The airborne part has remained relatively stable since the fall of the Soviet Union, two heavy bombers having been added to the Russian arsenal since 1999[125].

Thus, in the medium term, Russia should have a strategic arsenal that, although it is smaller than it was at the end of the 1980s, will have benefited from recent large scale modernization. Moscow has a total number of nuclear warheads equal to between 1 500 and 2 000 with more than 300 ballistic missiles, and it does not seem to have any practical concern about the deployment of an antimissile defense that, by the middle of the next decade, could be capable of intercepting a few tens of obsolete missiles. Similarly, it appears unlikely that the conventional strategic strike capacity would be capable of preventing Russia from using its deterrence force if necessary.

2.1.2 – Ongoing modernization of conventional strike and antimissile defense capacities

Apart from the effort to stabilize its strategic capacities, Moscow has started a series of programs since the 1996-1997 period designed to provide its forces with new conventional capacities. In some respects, setting up these means contributes to the renewal of Russian military power required by the Kremlin to complement a more

[122] « Reliability of Missiles for *Delta*-class Subs Confirmed », *WMD Insights*, November 2006 issue.

[123] Pavel Podvig, « Russian Strategic Nuclear Forces in the Next Decade », op. cit. http://www.aspen institute.it/icons/imgAspen/pdf/news/n3_05_Podvig_e.pdf

[124] « Test launch of Bulava missile fails third time this year – paper », By RIA Novosti, Dec 28th, 2006.

[125] Pavel Podvig, « Russian Strategic Nuclear Forces in the Next Decade », op. cit. http://www.aspen institute.it/icons/imgAspen/pdf/news/n3_05_Podvig_e.pdf

aggressive international and economic policy towards its Western partners and designed to win back some of the influence lost during the 1990s, particularly in countries formerly attached to the Soviet sphere.

Apart from operational improvements possible through these projects, most of them are also useful as a basis for military and economic cooperations with countries such as India, China or Syria.

Thus, in the field of cruise missiles and tactical ballistic missiles, Russia has benefited from financial support by States such as India and China, (at the cost of large technology transfers), and has been able to develop two missiles, the performances of which have enabled it to broaden its range of military options:

- The Yakhont antiship missile, also known under the name of Brahmos in its version co-developed with India, is a supersonic missile with a range of 300 km (capable of further development to reach 400 or even 450 km[126]) with a coastal attack capability. After a series of successful tests, this missile is progressively being brought into service in Indian land and naval forces[127]. This system, that is already available in ship and land-launched versions and for which a version carried by fighter aircraft could be developed, provides Russia with a unique capacity against an enemy naval force, or even to carry out prompt conventional strikes.
- The development of a conventional derivative from the AS-15 (Kh-555 or Kh-101), fired from a heavy bomber would give Russia a capacity that the Soviet Union did not have. The announced range for this missile, 5 000 km[128], would make it possible for Moscow to make conventional "intercontinental" strikes.
- The SS-26 Iskander, replacing both the SCUD and SS-23, is a tactical solid propulsion missile with a range of between 300 and 500 km. Development of this system began in the early 1990s and the first flight tests were carried out in 1996. It was commissioned in 1999, providing Russian forces with a medium range system that can be used in local conflicts against poorly or badly equipped opponents, but also with a system capable of penetrating antimissile systems with good precision[129]. In its conventional version, the SS-26 could be equipped with either a conventional explosive warhead or with sub-munitions. A MIRV type version carrying multiple warheads was apparently tested in flight in 2007[130]. Development of a nuclear warhead for use on this missile could be envisaged, although considering its precision, this missile was actually designed for precise tactical strikes.

The diversification of conventional strike means and the improvement in their performances, particularly in terms of penetration, are expressly aimed at circumventing an antimissile defense system[131]. These developments were initiated at the end of the

[126] « Kalam Asks BrahMos Developers To Work On Mark-II Version », by Staff Writers, New Delhi (ANI), June 26th, 2007.

[127] B. Gruselle, « Missiles et défenses antimissiles en Inde » (Missiles and antimissile defense systems in India), study in progress for the CEA, p. 19.

[128] B. Gruselle, « Missiles de croisière et stratégies d'anti-accès » (Cruise missiles and access denial strategies), op. cit., p. 16.

[129] http://www.fas.org/nuke/guide/russia/theater/ss-26.htm

[130] « Russia's first deputy PM says Iskander tests were successful », *RIA Novosti*, June 4th, 2007.

[131] « Putin Touts Russia's Missile Capabilities », The Associated Press, January 31st, 2006.

1990s, and they satisfy a logic of competition required by Moscow in response to American military progress. Beyond that, the success of these projects emphasizes the paradox of the Russian posture with regard to offensive and defensive pillars of the triad. Russia has never been in a better position to make conventional strikes at any point around the world, regardless of the antimissile means available. Moscow also has the means necessary to carry out this type of mission, even if it cannot claim to have a rapid action capability of the type envisaged in the PGS project.

Russia has also continued to modernize its antimissile defense means. Moscow's defense system, the durability of which was demonstrated by a series of tests in 2006[132], should be reinforced by the deployment of the S-400 Triumph, a new antimissile that should have performances similar to those of the THAAD[133]. With an interception ceiling at 40 km, the S-400 would be capable of intercepting missiles with a maximum range of 3 500 km[134]. It will probably be deployed around Moscow to replace the SH-08 Gazelle equipped with nuclear warheads[135]. With the modernization of its warning network, particularly satellite capacities, Russia now has one of the few antimissile defense systems capable of defending a large part of its territory. Due to its capacities, it is potentially in a position to protect part of its strategic forces against a nuclear or conventional American strike.

Image 7: The Triumph S-400 antimissile defense system

Considering the above elements, it would be unrealistic to think that Russia's military means, particularly its strategic forces, are genuinely threatened by the appearance of the conventional components of the new triad. However, this illustrates the United States' lead in capacity over its former enemy. If this lead should increase beyond Washington's currently limited objectives, Russia might find it difficult to maintain the current *status quo*, considering the technical and industrial difficulties that it is now facing and its relative economic vulnerability[136].

Even if Russian strategists have to take this problem into account, everything suggests that it has relatively little influence on the reaction to American projects related to the new triad in the short term.

2.1.3 – Mistrust, strategic parity and new competition?

The Russian attitude towards antimissile defense reveals several important elements that should be emphasized in this description and that when considered together, could start to explain Moscow's position towards the new triad.

[132] « Russia Successfully Tests Own Missile Defense », *Mosnews*, Dec 6th, 2006.

[133] Therefore, a zone defense capacity against medium range missiles.

[134] http://www.fas.org/nuke/guide/russia/airdef/s-400.htm

[135] http://www.fas.org/spp/starwars/program/soviet/gazelle.htm

[136] Richard Weitz, « Russian-American Security Cooperation After St Petersburg: Challenges and Opportunities », Strategic Studies Institute, April 2007, p. 5.

Firstly, there is clearly considerable mistrust towards American projects, based on an ambiguous analysis of proliferation by Russian politicians and armed forces. Even if the Russian political class and government are concerned about Iranian nuclear ambitions[137], it is still true that some military staff appear to consider that Washington deliberately overestimates the risk due to proliferation, essentially for political reasons[138]. American projects are then perceived as being directed against Russia, rather than being designed to solve this problem.

The lack of a bilateral verification system associated with the Strategic Offensive Reduction Treaty - SORT[139]) and the disappearance of START-1 constraints on this subject in December 2009, all contribute to aggravating Russian perception. Although Russia bases a great deal of its security (and power) on its nuclear capacities, the fear of seeing an unbalance materialize between its capacities and American strategic capacities (including means of countering a Russian warning or retaliatory strike while remaining capable of decapitating the Russian government[140]) probably has an influence on the policy adopted by Moscow. A sudden change in the parity of Russian and American strategic forces would modify the foundations of Russia's security policy because it would expose Russia to a preemptive American strike, by eliminating its capability of reprisal.

These difficulties are worsened by the fact that reemergence of the Russian military industry on the international weapons market puts the two countries into a competitive situation, even if this competition is largely virtual, because they do not have the same clients and do not supply the same equipment to them. For Russia, the appearance of criticisms of the American partner also follows a commercial logic towards positioning towards buyers, themselves sometime critical of and even hostile to the United States. Similarly, Moscow perceives American and Western efforts aimed at reinforcing international systems for the control of exports of sensitive goods as being attempts to destabilize the Russian weapons industry economy[141].

The progressive movement of its former European allies in the Warsaw pact into the Western block and American attempts to create close relations with the former Republics in Central Asia and the Caucasus, are other causes of deep mistrust by Russian armed forces.

Even so, military competition between Russia and the United States is relatively limited, if only because due to its lack of financial strength, Moscow knows that it

[137] On this subject, see Isabelle Facon & Bruno Gruselle, « La Russie au Moyen-Orient: « coopération militaro-technique », transferts sensibles et prolifération dans le domaine des missiles » (Russia in the Middle East – military-technical cooperation – sensitive transfers and proliferation concerning missiles), FRS, study in progress, section 3.1.

[138] Isabelle Facon, « La Russie et la QDR 2006: éclairages sur la relation stratégique russo-américaine » (Russia and the 2006 QDR: clarification about the strategic Russian-American relation), Notes from FRS, 31 March 2006, p. 4.

[139] Treaty signed in 2002.

[140] Richard Weitz, « Russian-American Security Cooperation After St Petersburg: Challenges and Opportunities », op. cit., p. 6.

[141] Isabelle Facon & Bruno Gruselle, « La Russie au Moyen-Orient: « coopération militaro-technique », transferts sensibles et prolifération dans le domaine des missiles » (Russia in the Middle East – military and technical cooperation – sensitive transfers and proliferation concerning missiles», op. cit., section 3.1.

cannot get involved in a project aimed at equalizing American power without endangering its economy. But also because Russian leaders share some of America's security concerns in terms of the growth of non-conventional risks and emergence of the Chinese power[142].

Thus, Russian postures caused by mistrust and anxiety about American political and military projects, do not form a genuine obstacle to setting up the new triad, provided that Washington works with Russia to produce a formal framework by which it can assure a degree of verifiable transparency of American strategic intentions.

2.2 – Chinese modernization and new triad

China's situation faced with the development of the new triad is completely different from the Russian's position, in several respects:

- Firstly, the United States considers the People's Republic to be its most likely future strategic competitor. As shown by the 2006 QDR, American armed forces consider that China is the only emerging power with the potential to militarily defy the United States[143]. Even if the document emphasizes the fact that Chinese political choices will eventually determine how the situation between the two States changes, there are many in Washington who already seen Beijing as being the United States' new military competitor.
- Beijing has also been involved in an effort to modernize its own military force for more than twenty years, particularly ballistic missiles and associated carriers, and this effort has already begun to bear fruit. For China, the objective is to hold modern means partly for operational and regional purposes (with the prospect of a military confrontation with the United States and its allies in the region), and partly to reinforce the credibility of its long-range nuclear forces in a second strike's posture. This modernization is based on major investments in the defense industry carried by the increasing economic power of the People's Republic of China.

Beijing's reactions to American projects probably reflect this twofold problem, particularly due to the possible consequences of strengthening relations between the United States, the two competitive regional powers (Japan and India) and obviously Taiwan. Furthermore, the objective for the People's Republic is to assure that its own capacities are capable of countering developments to American means. Unlike Russia, China's main difficulty in the subject is access to technologies rather than financing of its projects.

Finally, as we have seen[144], it seems fairly unlikely that Washington would start to implement specific bilateral transparency measures with regard to China, particularly because the United States believes that Beijing is deliberately concealing the magnitude of its own military capacities[145].

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[142] Isabelle Facon, « La Russie et la QDR 2006: éclairages sur la relation stratégique russo-américaine », (Russia and the 2006 QDR: clarification about Russian-American strategic relations) op. cit., p. 9.

[143] Department of Defense, « Quadrenial Defense Review Report », February 6th, 2006, p. 29.

[144] See §1.2.3.

[145] Department of Defense, « Annual Report to Congress: Military Power of the People's Republic of China – 2007 », p. 12.

Considering one example, the Chinese defense white paper states[146]:

« Pursuing a self-defensive nuclear strategy. China's nuclear strategy is subject to the state's nuclear policy and military strategy. (..) China upholds the principles of counterattack in self-defense and limited development of nuclear weapons, and aims at building a lean and effective nuclear force capable of meeting national security needs.(..) China exercises great restraint in developing its nuclear force. It has never entered into and will never enter into a nuclear arms race with any other country. »

But, deployment of a tactical ballistic capacity comprising several hundred missiles intended to support an armed action against Taiwan if necessary since the middle of the 1990s[147] raises several queries about the Chinese posture concerning the reprisal to a proven attack. Even if these missiles are not apparently equipped with nuclear warheads, their possible preemptive use against Taiwanese defense installations and as a means of slowing access of American forces to Taiwan, largely justifies the development of antimissile capacities of the United States' allies and American forces in the region. Similarly, the nature of this threat could lead Washington, to make conventional strikes in the case of a conflict around Formosa Strait to neutralize Chinese capacities as far as possible.

2.2.1 – Survivability of strategic and access denial capabilities

Since the middle of the 1980s, the People's Liberation Army has been carrying out a missile policy based on three pillars:

- Development and then deployment of tactical ballistic solid fuel missiles. Between 700 and 900 of these very high precision missiles[148] with a range of between 300 and 2 000 km, are deployed on the South coast of the country. The shorter range missiles (300 km) have been modernized so as to be able to reach all of the island of Taiwan.
- The development of ballistic and cruise missiles capable of targeting ships of the United States and their allies in the region. Apart from the acquisition or development of antiship or coastal attack cruise missiles[149], China has apparently developed a maneuvering re-entry vehicle for its DF-21 missile designed to target ships[150].
- Modernization of strategic missiles. Apart from the development of a very high precision solid fuel land based system DF-31 with an estimated range of 8 000 km and that could be used by the second Chinese artillery in the short term[151], a submarine-

[146] « China's National Defense in 2006 », Chapter II, National Defense Policy, document qui peut être trouvé en version anglaise à l'adresse http://english.pladaily.com.cn/site2/special-reports/2007gfbps/index.htm

[147] B. Gruselle, « Développements et rôle des défenses antimissiles en Asie » (Development and role of antimissile defense systems in Asia), Study for the CEA, December 2005, pp. 46-47.

[148] The overall deployment rate is evaluated at 100 systems per year See Martin Andrew, « Theater Ballistic Missiles and China's Doctrine of "Active Defense" », *China Brief*, Vol. 6, Issue 6 (March 15, 2006).

[149] B. Gruselle, « Missiles de croisière et stratégies d'anti-accès » (Cruise missiles and access denial strategies), op. cit., pp. 16-18.

[150] « Latest Chinese Missile To Target US Carriers », *Defense News*, May 17th, 2007.

[151] Department of Defense, « Annual Report to Congress: Military Power of the People's Republic of China – 2007 », p. 3.

launched variant, the JL-2, is on the point of being put into active service. Not only have missile qualification tests apparently been terminated, but the first Jin class nuclear submarine (type 094) carrying this missile has apparently started a sea trial period[152]. Even if the performances of this ship are not well known (some experts are doubtful about its stealthiness and also about the capability of the JL-2/094 pair to strike the United States territory[153]) it should enable China to increase the potential survivability and flexibility of its strategic forces.

Image 1: The first Chinese Jin class nuclear submarine (source Xinhua)

The effort being made by China towards the development of new ballistic capabilities enables it to substantially modify the situation of its arsenal, until now composed of a handful of intercontinental missiles – about twenty liquid fuel CSS-4/DF-5 equipped with a single warhead and with a range of 12 000 km and the same number of CSS-3 with a range of about 5 000 km[154] – based in silos and vulnerable to a preemptive strike. The new generation of medium range (DF-21/JL-1 - 2 500 km) and long range (DF-31/JL-2 and DF-31A) solid fuel missiles provides a firing capacity from submarines and from mobile land platforms, and also the possibility of carrying three MIRV type warheads and penetration aids[155]. Furthermore, the modernization and diversification program for its long-range ballistic arsenal is continuing, and Beijing might eventually develop new intercontinental missiles (DF-41) and improve the performances of those currently under deployment[156].

By the next decade, China should have a larger quantity of missiles capable of reaching the Continental United States. However, it appears difficult to give any figures in the lack of precise data about possible production rates[157]. Considering the industrial demonstrated capacity for tactical missiles, Beijing could be capable of collecting about fifty modern strategic missiles by about 2012, in addition to the CSS-4, and could have between 150 and 200 nuclear warheads[158].

[152] « China conducts sea trials of nuclear subs », Radio Australia – News, March 3rd, 2007.

[153] Arms Control Wonk, « How Capable is the 094? », August 1st, 2007.

[154] Department of Defense, « Annual Report to Congress: Military Power of the People's Republic of China – 2007 », p. 3. See also http://www.fas.org/nuke/guide/china/icbm/df-5.htm

[155] http://www.fas.org/nuke/guide/china/icbm/df-31.htm

[156] Thus, the Chinese press agency has recently published photos of a new missile that could be the new version of the DF-21. See « Photos reveal what may be new Chinese long-range missile », East-Asia-Intel.com, November 29, 2006.

[157] No credible source gives any specific estimates about the size of the future Chinese arsenal.

[158] « Report: China has 130 nuclear warheads », East-Asia-Intel.com, May 3rd, 2006.

Apart from its strategic ballistic capacities, Beijing has also started to equip its forces with cruise missiles for land attack missions and for resistance against surface ships.

Thus, the acquisition of naval launch platforms (Kilo class submarine and Sovremenny class destroyers) and Russian fighter aircraft (Sukhoi-30 Mk-2) has enabled the People's Liberation Army to acquire a broad range of antiship means[159]. Thus, China appears to have a large arsenal of SS-N-22 Sunburn supersonic missiles with a range of 200 km, and SS-N-27 Klubs with a range of 300 km, deployed on ships obtained from Russia. Beijing has apparently approached Moscow for the delivery of the SS-N-26, from which the Brahmos is derived, to be used on Sovremenny destroyers delivered by Russia in 2005[160]. Su-30s are equipped with the AS-17/Kh-31A supersonic missile with a range of 200 km[161]. Apart from these acquisitions the Chinese army has also undertaken the development of antiship missiles for use on carriers developed and produced locally.

The development of land or coastal attack cruise missiles was also started in 1993, after Chinese armed forces decided to modernize their capabilities following Operation Desert Storm[162]. China thus put the first units of a 600 km range cruise missile, the Hong Niao-1, probably developed with the assistance of Russia, into service in the middle of the 1990s. The last missile in this family currently under development could have a range of 2 500 km, and it could be intended for deployment on Chinese class 093 nuclear attack submarines[163].

Based on these estimates, it would appear that by 2010, China would be capable of penetrating a limited antimissile defense like that currently envisaged by Washington, if only due to the number of warheads available to it, or regionally using its cruise missile arsenal. Nevertheless, Chinese strategic forces remain relatively vulnerable to the combined use of conventional tactical and strategic strikes on their launch means, particularly land means, and on their attack submarines and anti-ballistic protections. However, this vulnerability should reduce in the longer term as the Chinese stock improves and increases in number. Furthermore, even in the short term, the use of decapitation strikes against Chinese strategic means can only be conceivable under dramatic circumstances due to the high risk of Chinese reprisal using means that have not been neutralized.

However, Washington could envisage the use of conventional strategic strikes against Chinese short and medium range missiles within the framework of a regional conflict involving Taiwan or access to natural or energy resources. This would be the case particularly because the People's Liberation Army considers that these missiles have an important role to play in a preemptive strategy aimed both at slowing American operations by targeting naval forces (aircraft carriers and large ships) and United States

[159] B. Gruselle, « Missiles de croisière et stratégies d'anti-accès » (Cruise missiles and access denial strategies), op. cit., p. 19.

[160] Ibid, p. 17.

[161] http://www.globalsecurity.org/military/world/russia/as-17.htm

[162] Department of Defense, « Annual Report to Congress: Military Power of the People's Republic of China – 2007 », p. 11.

[163] B. Gruselle, « Missiles de croisière et stratégies d'anti-accès » (Cruise missiles and access denial strategies), op. cit., p. 20.

rear bases in the Pacific, as far as possible from the zone, at neutralizing the main of Taiwanese defense means and at deterring an outside intervention[164]. Consequently, neutralization of Chinese launch means would no doubt be one of America's priorities, knowing that existing antimissile defense means for which deployment would be possible would not be sufficient to protect all possible targets[165].

Nevertheless, both diversification of Chinese access denial means[166] and the numeric increase in capacities or the increase in their performances considerably reduce the real impact of the United States using its future rapid strategic strike means. Their real contribution to an American effort to maintain the necessary freedom of maneuver for a regional action could only be marginal because of their limited number. Thus the fact that American leaders currently consider the PGS capacity to be like a "silver ball" that would only be used occasionally forms a tangible limit to their use in a conflict against a regional power like China.

From the Chinese point of view, the emergence of conventional offensive and defensive pillars of the new triad could create real limitations in the case of a conflict with the United States or its allies in the region. In fact, the antimissile capacities deployed regionally and the existence of rapid strike means combined with high precision systems (cruise missiles, laser guided bombs, etc.) could significantly alter China's options. In a scenario involving the invasion of Taiwan, in particular a Chinese victory would partly be based on the capacity of its strike means to durably neutralize the island's defense and to significantly slow down American reinforcements[167]. Neutralization of even a small portion of these systems or even of Chinese command and control capacities, either through successful interceptions or the destruction of launch means or C2 centers, would reduce China's chances of success. In such a scenario, it might be imagined that China would face the choice between using all of its means as quickly as possible, or losing the possibility of using them[168].

2.2.2 – Chinese approach to the new triad

Since the American withdrawal from the ABM treaty in 2002, Beijing has made relatively little public criticism about American projects related to the new triad. While the People's Republic demonstrated strong international activism to slow down the antimissile defense program alongside Russia, it did not officially react either to the launch of the Japanese program in 2003 nor to publication of the QDR in 2006, but continued to notify Washington its hostility to seeing Taiwan integrated into the

[164] Department of Defense, « Annual Report to Congress: Military Power of the People's Republic of China – 2007 », p. 12.

[165] B. Gruselle, « Développements et rôle des défenses antimissiles en Asie », (Developments and role of antimissile defense systems in Asia) Study for the CEA, December 2005, pp. 49-50.

[166] Beyond the strategies aimed at naval, land or air means, China appears to be developing systems for neutralization of space means or computer networks.

[167] B. Gruselle, « Développements et rôle des défenses antimissiles en Asie » (Developments and role of antimissile defense systems in Asia), op. cit., p. 49.

[168] The alternatives are detailed relatively well in: C. Blockom, S. Kan et A. Woolf, « U.S. Conventional Forces and Nuclear Deterrence: A China Case Study », CRS Report for Congress, Congressional Research Service, August 11th, 2006, p. 29.

antimissile defense system[169]. This reaction owes much to the perception by Chinese leaders of the inevitable aspect of the American deployment of this type of system[170], that should also include the other conventional component of the new triad.

However, as we have seen, the American project could eventually disturb Chinese military capacities despite efforts made by Beijing to restructure its military capacities and to modernize its strategic forces[171]. However, several factors could placate Chinese concerns and possibly explain the lack of reaction by the People's Republic:

- Operational deployment of means associated with the new triad should not take place before the 2010-2012 period. This latent period provides Beijing with an opportunity to complete efforts initiated in the 1990s, while continuing to adapt its force structure to the prospect of a conflict involving the United States. Observation capacities (including space) and communications and command capacities would appear to be the APL's priorities. Their development would enable China to limit the impact of conventional American strikes, if any, against its access denial means or strategic forces, for example by allowing it to evaluate the effects of its own strikes and thus reduce the uncertainty associated with the use of its tactical missiles. Moreover, Chinese forces could use this time to benefit from the deployment of mobile forces and warheads designed to penetrate antimissile means.
- Extension of the antimissile defense network to Taiwan was obviously discarded by Washington. Although Taipei has not renounced purchasing American off-the-shelf capacities (for example the *Patriot Advanced Capability*-3 system or advanced warning means), neither the supply of high level systems (AEGIS or THAAD) nor integration into the American warning and command systems are on the agenda for the moment. Consequently considering their number and performance, the Chinese government sees Chinese tactical ballistic missiles as remaining relevant in the event of a war and during the first days of this war.
- China's options for finding a solution to the appearance of the new triad are economically, technically and technologically, limited[172]. Apart from pursuing the nuclear modernization program, which should continue to enable China to guarantee a second strike capacity, Beijing is not in a position to enter an arms race with Washington because it could not win it. The reorganization of its forces is essentially based on exploitation of weaknesses of American power rather than on development of a military system that could effectively achieve parity with the United States[173].

Strategically, the appearance of the new triad could contribute to a change in China's posture. One of the questions that should be considered by Beijing, apart from the qualitative improvement to its long-range ballistic capacities, is whether there is any

[169] B. Gruselle, « Développements et rôle des défenses antimissiles en Asie » (Developments and role of antimissile defense systems in Asia), op. cit., p. 16.

[170] B. Roberts, « China and Ballistic Missile Defense: 1955 to 2002 and beyond », Proliferation Papers, Winter 2004, p. 36.

[171] See also B. Roberts, « Dissuasion and China », *Strategic Insights*, Volume III, Issue 10, October 2004. http://www.ccc.nps.navy.mil/si/2004/oct/robertsOct04.pdf

[172] Ibid.

[173] Roger Cliff, Mark Burles, Michael S. Chase, Kevin L. Pollpeter, « Entering the Dragon Lair: Chinese Antiaccess Strategies and Their Implications for the United States », RAND Project Air Force, 2007, p. 27.

need to significantly increase the number of its missiles (and/or its nuclear warheads), to guarantee survival faced with conventional strikes and antimissile defenses. Furthermore, new Chinese systems are significantly different from previous systems due to their deployment method (on mobile launchers, submarines or land vehicles) that should oblige Chinese forces to match missiles with warheads, *de facto* placing them at a higher alert level. Changes to the Chinese ballistic stock would thus enable a launch based on detection of attack, which is *a priori* impossible with existing systems for which the vectors and heads would be separate[174]. While there is apparently an ongoing internal debate in China about the change from the nuclear doctrine towards limited deterrence[175], a quantitative increase in the ballistic arsenal that would be considered necessary to face deployment of the triad, could precipitate a decision. This is particularly true because China's strategic approach in the case of a war with the United States appears to be based partly on the concepts of preemption and surprise[176]. Even if Chinese studies relate to management of a conventional conflict with the United States, they could be a starting point for a more deep-seated change in Chinese military concepts.

The increasingly close relations between India and the United States, particularly in antimissile defense, and Japan's participation in the missile defense project, have also apparently influenced the Chinese posture. The participation of these two main regional competitors (even a simple technical cooperation in the case of India) could encourage an increase in China's ballistic stock and the number of available nuclear warheads.

2.3 – Impact on proliferating countries

In its presentation of the new triad, the American administration, apart from the possibility of using antimissile defense systems and strategic strikes to limit risks related to the use of weapons of mass destruction against the United States or its allies, mentions the deterrent nature of the means observed on non-conventional weapon programs engaged by proliferating countries. Using the terms used in the 2001 NPR, the idea is to be in the position to strike "*a wide range of targets in a country so as to deter a potential opponent from developing threatening capabilities*"[177].

A detailed study of the reasons for which a State decides to acquire non-conventional capacities and to develop them and deploy them, could be carried out to get a better idea of the potential impact of means envisaged by the United States. However, some evaluation elements are useful for determining the possible influence of conventional pillars of the new triad on proliferation:

- For many countries in a position to initiate (or continue) non-conventional weapons programs, the will to be present on the international scene, particularly with regard

[174] Which appears logical to guarantee the security of the strike force and that also corresponds to a Chinese concept aiming at a reprisal following a proven nuclear attack. B. Roberts, « China and Ballistic Missile Defense: 1955 to 2002 and beyond », op. cit., p. 39.

[175] Ibid, p. 42.

[176] Roger Cliff, Mark Burles, Michael S. Chase, Kevin L. Pollpeter, « Entering the Dragon Lair: Chinese Antiaccess Strategies and Their Implications for the United States », op. cit., pp. 28-29.

[177] Department of Defense, « The Nuclear Posture Review », Submitted to Congress December 31st, 2001, p. 12.

to the United States, often has a significant influence on the decision. The aim may be to free themselves from the United States authority or protection, to prevent interference in their affairs, or more simply to deter an American military intervention.

- The technical and economic feasibility of programs and their political and strategic efficiency, is also influential. In fact, the objective is to make an affordable investment to obtain weapons with a high political value due to the potential effects of their use. The cost-benefit calculation is also involved in decisions about continuation of a development and its advantages, as was shown in the Libyan case. Thus, a State can renounce the development of a non-conventional potential because of the high cost (technical and financial) in comparison with the expected benefits, for example if they are limited by the existence of antimissile defenses or a high risk of these capacities being destroyed during a conflict or a crisis.

The decision to proliferate (or continue a proliferation activity) is made as a function of several factors that interact with each other and may change with time and sociopolitical change in the country and its international environment[178]. Thus, the precise influence of deployment of the new triad seems difficult to establish without considering specific cases.

However, setting up the new triad may play a deterrent role towards some countries that might be tempted to initiate non-conventional programs in two ways:

- By forcing the State to consider the risk of its efforts causing an American military reaction that might not only neutralize its program but also endanger its political stability. This assumes that the United States (or its allies) is capable of quickly detecting a proliferation effort and obtaining sufficient data to carry out preventive counter proliferation actions. However, a country that would consider the possibility of launching a weapon of mass destruction program would use all means available to it to camouflage its development, precisely so as to make it extremely difficult to obtain usable information against this program (and even if possible to make it difficult to detect it). Known examples show that proliferation efforts are very difficult to detect and qualify, and that the data that can be obtained are too imprecise to be usable for military operations[179].
- For operations aimed at the political determination of a State, the capacity to threaten the government of the country is also based on the effectiveness of intelligence tools and the possibility of striking a target quickly and precisely. If these two capacities are proven, it appears possible to influence the will of the leaders of a country to initiate or continue a weapon of mass destruction program. Thus, according to some sources, it would appear that the Desert Fox operation, during which the United States used more than 300 Tomahawk type cruise missiles to bomb various Iraqi sites –several centers of the Special Republican Guard and security forces in addition to the sites associated with the missile program, - had a strong influence on Saddam Hussein's will to continue nuclear, chemical or

[178] Steven E. Lobell, « Regional Powers and The Politics Behind WMD Proliferation », 2005. Available on http://www.poli-sci.utah.edu/~slobell/WMD %20Proliferation.pdf

[179] Jason D. Ellis, « The Best Defense: Counter-proliferation and US National Security », *The Washington Quaterly*, Spring 2003, p. 123.

biological projects[180]. In any case, precise and massive strikes probably do have an influence on the political will of the countries against which they are made. However, the main weak point in current means is due to the fact that they are only capable of striking fixed targets with a usage time of several hours. Setting up a system that could reduce this time to less than an hour could further increase the psychological impact of strikes on the executive of a State.

- By offering reinforced security guarantees to countries that might get involved in non-conventional programs. While the possession and/or development of nuclear, biological or chemical capabilities by a regional opponent would undoubtedly have an effect on the decision to initiate an identical weapons project, possibly to complement a nuclear umbrella, and using the conventional components forming the new triad, the United States would be in a position to propose additional tools to improve the security of cooperating states to convince them not to continue their efforts. The Taiwanese and South Korean cases show that the combination of renewed military assurances and political pressure applied by the United States can guide a development decision[181]. But they also show that reinforcement of security relations alone is often insufficient to prevent initiation or continuation of a program.

Thus, the deployment of antimissile defense and the development of conventional strike capacities by the United States could reduce the will of some States to begin the development of weapons of mass destruction. On the contrary, they may reinforce existing programs through a quantitative or qualitative increase in the arsenal, diversification of carriers, hardening and camouflage of installations. This is particularly understandable for countries for which non-conventional projects are institutionalized nationally[182] as central means towards their security, status and sovereignty.

Consequently, in order to obtain a better definition of the influence of the new triad on proliferating countries, it seems necessary to determine how these States will undertake to create their projects. Two proliferation approaches can be distinguished:

- The first approach involves progressive consent of the Society – the executive, bureaucratic and military elite and possibly the public – to the need to develop and/or possess these weapons. The process may take several years, but if not interrupted, it can make it practically impossible to question the possession of weapons. For example, the durability of the Indian nuclear program is the result of the progressive acceptance of technical and financial arguments made by the program leader, Homi Bhabha by the national bureaucracy [183].
- The second approach can be summarized as a decision about acquisition or development imposed by the Government or the Head of State on the rest of the society. The construction of a national consensus is not required, nor is it necessary to obtain genuine consent by the bureaucracy or the military. Such a model appears

[180] Barry D. Watts, « Six Decades of Guided Munitions and Battle Networks: Progress and Prospects », Center for Strategic and Budgetary Assessments, March 2007, pp. 240-241.

[181] Rebecca K.C. Hersman and Robert Peters, « Nuclear U-Turns: Learning from South Korean and Taiwanese Rollbacks », *The Nonproliferation Review*, Vol. 13, N°3, November 2006, p. 547.

[182] Peter R. Lavoy, « Nuclear Proliferation Over The Next Decade », *The Nonproliferation Review*, Vol. 13, N° 3, November 2006, p. 436.

[183] Peter R. Lavoy, « Nuclear Proliferation Over The Next Decade », op. cit., p. 440.

much more fragile with regard to changes in the national and international political, economic and technical context, even if after several years, such a proliferation approach can strengthen the project based on the previous model. However, everything suggests that if there is no deliberate, continuous and durable effort to create and diversify bureaucratic and popular supports, the consensus that might arise would remain superficial and therefore fragile.

Therefore the deterrent nature of the new triad would be more pronounced if the decision to initiate the weapons of mass destruction program is recent or if it is autocratic and not based on the creation of a national consensus. In this framework, if the capacity to quickly reach and effectively neutralize the targeted objectives is achieved, the effectiveness of strategic strikes should be increased compared with the use of cruise missiles for which the use and flight duration are such that the countries concerned can use tactics to move potential targets.

Conversely, its efficiency as a political instrument will probably be lower for programs that have been in place for some time and that benefit from a political momentum. Thus, the new triad appears particularly useful to apply pressure on States facing choices – whether to initiate a program, or redirect it, or even to evaluate the technical and/or military relevance – or to modify major decisions that have already been made.

2.4 – Impact on terrorist actions

The benefit of conventional rapid strike actions on the struggle against terrorist movements appears fairly difficult to measure at first sight. Unlike the situation applicable for States, their deterrent value towards a group's ambitions to acquire weapons of mass destruction would at first sight appear very low, since it is impossible to make a long term threat to the structure or political will of such an organization[184].

On the other hand, their operational advantage (even if it depends largely on the effectiveness and reactivity of intelligence tools that input data to the target loop) is particularly marked because terrorist organizations are characterized by the mobility of their forces, and their command, executives and means. A target remains valid for only a relatively short period beyond which armed action to neutralize it is completely ineffective. Therefore, it is particularly useful to be able to reach it as quickly as possible.

Furthermore, the question of the possible reaction of a terrorist organization threatened by conventional strike means is not as critical as it is for a state, particularly when the State has non-conventional means. Furthermore, limited strikes against this type of objective do not necessarily raise complex problems in terms of international law, and risks of escalation can be minimized.

Therefore, the prompt strike capacity could be used in isolated cases against several types of targets belonging to non-state groups, with few political or legal constraints[185] :

- For example non-conventional weapons during their transport, storage or even their use; if no military means is effectively within range of the target to neutralize it, this alone

[184] Defense Science Board Task Force, « Future Strategic Strike Forces », op. cit., Chapter 2, p. 12.

[185] « Interim Letter of the National Academies Panel on Prompt Global Strike », May 11th, 2007, pp. 3-4.

justifies the acquisition of systems for which the range would be sufficient to reach it. This is particularly true for the transport or use phases during which the time to act is limited.

- Persons with a key role in the organization or who work together in a given location to plan or carry out actions. In particular, a global prompt strike capacity will be particularly useful to reach zones that would be inaccessible using existing means (protected or out of reach) or for time sensitive targets.

Therefore, rapid conventional strike means appear to have an influence on terrorist risks, by filling in a capacity gap that non-state organizations use to continue to exist and operate in the long term. However, several factors limit the real impact of PGSs; the number of available weapons, the final precision, penetration capacities[186]. They will determine the spectrum of what can actually be targeted as a function of the target environment (particularly the risks of collateral damage), type and political and/or operational value.

Finally, their real performances, in other words as demonstrated in use, could contribute to giving PGSs a certain deterrent value, particularly concerning the initiation (or continuation) of efforts made by terrorist organizations to achieve weapons of mass destruction. Thus, if the United States can effectively target and neutralize production or transport of these weapons, some organizations might renounce acquisition considering that the investment is too expensive compared with the feasibility and cost.

2.5 – Building a new weapon control paradigm

Although it is still applicable at the moment, the START treaty will disappear permanently in 2009, leaving only the agreement signed in Moscow in 2002 to control changes to Russian and American nuclear arsenals. Moreover, the usefulness of the traditional *arms control* framework inherited from the end of the Cold war period needs to be reconsidered because there is the prospect of a major revision to the American posture, the modernization of the Chinese arsenal and the reorganization of Russian capacities. Furthermore, despite the disappearance of START, some constraints should continue to apply to Washington, that are reconsidering the planned use of conventional strike capacities. This is the case particularly for the firing notification agreement that binds the United States and Russia and that will not expire in the same way as the treaty.

This question leads to another, which is the extent to which measures could be taken to control Russian and Chinese concerns about American projects? The objective is both to produce a catalog of tools and to determine their advantages and disadvantages so as to select which among the most relevant could be implemented in practice in the short and medium term. But to achieve their objective, these means must be organized together politically, *a priori* based on a high degree of confidence between the parties concerned. None of them is capable of guaranteeing the required level of security independently, particularly because Russia and to a lesser extent China are assigning an increasing place to their nuclear means in their defense postures.

[186] In particular, the *Defense Science Board* recommends that the capacity should be sufficient to strike from 300 to 400 targets. See *Defense Science Board Task Force*, « Future Strategic Strike Forces », op. cit., Chapter 2, p. 16.

Thus, in order to be able to set up the conventional part of their new triad, the United States must be capable of rebuilding a weapon control system that guarantees the operational margin of maneuver that it needs. The first step to achieve this is undeniably to set up criteria for transparency and verification of the corresponding strategic means with Russia.

2.5.1 – Preparing the after START

The creation of an agreement intended to replace START will not necessarily aim at further reducing the levels of American and Russian arsenals, the treaty signed in Moscow in 2002 already proposes significant reductions, but it would enable the two parties to restore a suitable degree of transparency both to control developments in nuclear means and conversion of some vectors for conventional missions.

Note that existing reserves made by the different parties on constraints created by the current treaty make it impossible to envisage its pure and simple renewal. On the American side, such an option would means renouncing the development of the *Prompt Global Strike* (PGS) project[187]. For the Russians, it would prevent continuation of the effort to reorganize their strategic capacities[188]. Furthermore, the financial effort required to make full use of the inspection system derived from START appears impossible for Moscow at the moment, and in the same way, it is probably pointless to plan mechanisms as extensive as the existing mechanisms due to the much higher degree of confidence between the two partners than at the time that START was concluded.

In order to face the new problems raised by the new triad and reorganization of Russian capacities, a new weapon control tool (which the two administrations accepted to discuss in July 2007[189]) should contain measures concerning:

- Zones and forms of possible deployment of conventional strategic systems. The first objective would be to facilitate movements of strategic missiles with a nuclear capability on mobile platforms, knowing that an increasing part of the Russian arsenal is intended to be mobile, while making them more transparent for both parties. But especially, the end purpose of measures taken within this framework would be to facilitate the deployment of conventional missiles on fixed sites or on naval platforms. For example, the agreement could identify specific zones (including sea) with the vocation of sheltering conventional capacities.
- The verification of the number and type of warheads deployed or stored. This provision is intended to determine the number of warheads and their status actually available in each State satisfactorily and with certainty. Concerning reentry vehicles associated with the PGS capacity, this verification could be extended to include intrusive inspections and interviews with experts concerning performances and characteristics (particularly signatures, path) enabling Russia to differentiate them from nuclear means. In this respect, the main difficulty could be Moscow's will to

[187] Cf. § 1.2.1.

[188] Anatoli Diakov & Eugene Miasnikov, « RE-START: The need for a New US-Russian Strategic Arms Treaty », Arms Control Association, September 2006.

[189] « US, Russia To Ink Accord on Strategic Weapons Talks », *Defensetalk*, July 3rd, 2007.

include conventional warheads in the list of strategic means[190]. It seems fairly unlikely that the United States would accept such a limitation that would effectively mean restricting PGS means to occasional opportunist strikes and limiting the possibility of deploying several heads per missile. Although at the moment, Washington does not appear to want to hold a large number of conventional strategic vectors, *a priori* it cannot be excluded that the number might be increased to broaden the spectrum of their use.

- Setting up an adapted notification system for the use of PGS capacities. The agreement in force at the moment deserves to be kept in that it forms a means of limiting risks of incorrect interpretation of firing by one of the two countries. But it must be adapted to take account of the fact that use of a missile for conventional purposes cannot be decided upon 24 hours in advance in the PGS logic. Therefore, the objective is to provide a system that Washington could use to notify the Russian command system at least a few minutes before firing a conventional missile. To achieve this, it would be useful to provide Moscow with access to some of the data originating from the American command system. For example, this would be possible if Russia participated in *Missile Defense* through technical contributions. Pursuing this *Joint Data Exchange Center* (JDEC) project launched in 1998, but that was obviously abandoned since[191], could provide Washington with the means of sharing some data originating from its own network with the Russians.

Beyond the production of new tools, particularly for verification and notification, such an agreement would enable the two countries to exchange data about their strategic tools, to guarantee common understanding of the stakes and the means envisaged to face them, both by military and technical experts. In the light of the mistrust of American objectives by Russia's defense experts that is reflected in Washington by concerns about Russian drifts in terms of security – it also seems important that this dialog should question nuclear postures and in particular raise the possibility of decreasing the alert level of the forces involved. An extension of these exchanges between experts to include China could usefully participate in reducing Beijing's concerns and encourage the emergence of a consensus on strategic doctrines between the three States.

One of the difficulties that might arise concerns the participation of third party countries in the new triad. As we have already seen, several countries should initially be integrated into the American command system, due to their participation in the antimissile defense program. Some of them may eventually host American capacities intended for rapid conventional strikes in their country (including their territorial waters), and might even provide their own strike means within a single command.

This case raises a question about the need to extend a future agreement between Russia and the United States to third party countries, so as to take account of all capacities related to the PGS project. Such a solution could be difficult to set up for means that do not belong to the United States because this would mean that the States concerned accept a level of Russian control on their own systems equivalent to the level of Russian

[190] Anatoli Diakov & Eugene Miasnikov, « RE-START: The need for a New US-Russian Strategic Arms Treaty », op. cit..

[191] Pavel Podvig, « Russia and the Prompt Global Strike Plan », PONARS Policy Memo N°417, December 2006, p. 3.

control that would exist on United States systems. However, although this concerns conventional systems, their technical and operational link with American strategic capacities makes it difficult not to apply a high transparency level for them. As seen from Moscow, these conventional means could be used against Russia in the framework of an operation intended to neutralize its strategic forces or its political leaders.

At another level, the negotiation of a bilateral agreement on nuclear and conventional strategic capacities raises two specific problems that cannot be ignored:

- The number and the control of tactical nuclear weapons; uncertainties that affect means available to Russian forces exacerbate American and European concerns. In fact, there does not appear to be any bilateral agreement that would guarantee a minimum level of transparency on available quantities and also on possible methods of using these systems. Russia should start elucidating its approach, although it is questioning the treaty on intermediate nuclear forces concluded in 1987[192].
- Deployment of antimissile means; even if it is unlikely that the United States would agree to return to such a restrictive framework as the 1972 treaty on antiballistic missiles (ABM treaty), a new agreement could set up transparency and verification measures specific to this type of system. It should be sufficiently precise technically to eliminate Russia's concerns about American interception capacities. However, negotiation of a bilateral treaty intended to replace START could initially put the question to one side to facilitate conclusion of an agreement.

2.5.2 – Increase means of distinguishing between conventional and nuclear missiles

In order to operate, a future bilateral agreement would also require the United States to make an effort to adapt their conventional missiles so as to distinguish them from missiles carrying nuclear warheads during use. This effort concerns not only identifiable characteristics of missiles, but also their deployment, their concept of use and their operational link with nuclear means.

In making STRATCOM responsible for the coordination of all means of the new triad, the White House and the Pentagon actually reinforce the link between nuclear and conventional missions assigned to American strategic forces. This is the case particularly because there is an ambiguity about the possible recourse to American nuclear means in the framework of the concept of a conventional strikes operation[193]. Even if operationally, it would appear natural that this command structure is responsible for operational planning and coordination of antimissile defenses and PGS systems, it appears necessary to arrange matters such that these missions are separate from missions using the nuclear system. It appears particularly important that the United States should assure that conventional strikes by ballistic missiles remain exceptional based on the use of a very small number of missiles. As stated above[194], it would then appear very improbable that the Russian command structure would consider firing of a handful of missiles as a preemptive nuclear strike. Finally, plans to use these missiles

[192] Martin Sieff, « Russian Threat To Withdraw From INF Not Bluff », UPI, February 21st, 2007.

[193] Hans M. Kristensen, « Global Strike: A Chronology of the Pentagon's New Offensive Strike Plan », Federation of American Scientists, March 15, 2006, pp. 5-6.

[194] See. §1.2.2.

should be made so as to choose paths distinct from paths that might threaten Russian airspace.

This comment is also applicable to any co-location of conventional and nuclear systems. Among the options envisaged by Pentagon, the conversion of Trident-II missiles creates a particular problem to the extent that it assumes that patrolling submarines could carry missiles with both nuclear and conventional warheads. Several solutions could be envisaged to limit risks inherent to this problem:

- Deactivate launching of missiles with nuclear warheads carried by submarines assigned to PGS missions, in the case of an alert. But this option appears difficult to handle in terms of command and control, and even if transparency measures were set up towards the Russia, the Russian command system might incorrectly interpret a launch from a ship performing the two missions. No doubt the more judicious solution would be to assign a few submarines exclusively to the PGS mission, with no nuclear option, to develop missiles dedicated to this mission and to geographically separate patrol zones assigned to the two components. The *Defense Science Board* estimates that the development cost of a new submarine launched ballistic missile intended for PGS type missions is 1.5 billion dollars, plus a billion dollars for production, to be ready for commissioning starting from 2012[195].
- The modification of conventional missiles to give them specific characteristics. For example, this might consist of designing particular flight profiles that can be distinguished from flight profiles used by missiles carrying nuclear warheads. The development of warheads with specific infrared and radar signatures could provide another suitable solution for which the cost would remain relatively modest. This is particularly true because the United States should develop and then produce warheads intended for the PGS mission. Russian experts should physically verify these data, for which the principle could be approved *a posteriori* within the framework of a possible weapon control agreement.

In land-based systems, the risk related to co-location of nuclear and conventional strategic strike means is particularly high. Therefore it is essential that the United States should separate systems dedicated to nuclear missions from systems dedicated to conventional missions.

It would also be helpful towards Russia to assure that missiles modified for conventional missions should not be fitted with warheads other than those intended for this type of use. Physical or software systems could be integrated into conventional systems to prevent separation between the booster and the warhead itself. The conversion cost of a few tens of Peacekeepers or Minuteman missiles is evaluated at about 1 billion dollars[196], and it is estimated that these types of locking methods could be set up for a fraction of this amount.

For practical reasons, these measures should not necessarily initially be based on the conclusion of a new arms control agreement between Russia and the United States. However, the possibility of Russian experts making the final verifications should be taken into account when defining these measures. Washington should be ready to provide all information concerning them to Moscow (and possibly eventually Beijing)

[195] Defense Science Board Task Force, « Future Strategic Strike Forces », op. cit., Chapter 1, p. 9.

[196] Ibid.

to improve the efficiency of these measures, and agree to abide by their inspections and criticisms.

2.5.3 – Calendar and scenario

Setting up a new framework for arms control, including extension to China, could be considered eventually, intended to satisfy important interests both on the American and Russian sides, and from this point of view its negotiation would appear to be acceptable to both parties.

However, the calendar is fairly restrictive for such an agreement, to the extent that the first American conventional offensive capacities could be deployed at the beginning of the next decade.

Apart from political obstacles that could slow work related to this new framework, several practical questions have to be solved, being a system intended to enable physical and technical verifications of the capacities of each party. Thus, negotiators will have to define the type of inspections, their frequency and their financing methods[197] and also the nature and level of detail of exchanged information. Furthermore, a change to the existing notification system at the moment would undoubtedly depend on the development of communication tools, or even if the JDEC project is restarted, specific infrastructures for its operation.

Finally, the emergence of a new control system would appear to be difficult to imagine before several years, and particularly if China is associated with the process. In the short term, the nature of safety measures that the United States might produce would tend to reduce the risk of incident, but alone they cannot guarantee a satisfactory security level in the long term.

Therefore, construction of the new control framework should be envisaged by steps, progressively increasing the range of measures taken and subjects considered. Schematically, four milestones could be fixed to reach this end:

- In the very short term (2010-2012): the United States initiates negotiations with Russia on the new control system. Objectives to be satisfied by the new framework are fixed, the priority being to set up verification means on offensive systems and modification to the notification system. The development of unilateral safety measures will be discussed in technical exchanges between experts. Furthermore, an agreement on the common development of data communication and exchange systems is required.
- In the short term (2012-2014): conclusion of a first agreement concerning declaration, verification and inspection measures on strategic offensive means. A second negotiation round could be initiated firstly on tactical nuclear systems to obtain a high degree of transparency on operational and quantitative aspects, and secondly on data exchanges concerning antimissile defense systems. The data communication and exchange system is approved and work towards its construction has been initiated.

[197] Anatoli Diakov & Eugene Miasnikov, « RE-START: The need for a New US-Russian Strategic Arms Treaty », op. cit.

- In the medium term (2014-2016): conclusion of an agreement on tactical nuclear means and antimissile defense systems. Studies could be initiated on the question of mutual warning levels and doctrines for the use of strategic means.
- In the long term (2016+): extension of negotiations on the framework of arms control to China.

By deliberately choosing a progressive solution to questions that concern them, Moscow and Washington would avoid the trap of a long and uncertain negotiation that could delay the treatment of critical and urgent problems. In this case the priority would be to recreate a tool intended to maintain transparency of offensive strategic arsenals.

Conclusion

Since the new triad concept was produced in 2001, Washington has firmly committed itself to development of the conventional parts of this tool. From the defensive point of view, the *Missile Defense* program has seen many technical and operational developments. Apart from the deployment of the first interceptor sites on the West coast, the naval component (*Sea-Based Midcourse System*) appears to be the most advanced, particularly due to the commitment by several of the United States' allies to the acquisition or construction of AEGIS type ships that could eventually be integrated into a single command network, thus multiplying interception capacities of the system. This network concept forms the main internationalization vector of the new triad. The command system currently being developed for the MD structures all available warning, flight path mapping and interception means in an engagement control and planning tool that is essential for the operation of American and allied means. This is particularly the case because the command architecture selected by the United States that places regional commands at the heart of the engagement process but centralizes coordination in STRATCOM, encourages progressive merging of allied antimissiles defense means in a single command system.

Furthermore, this single command system should eventually be integrated into a broader network including all conventional systems in the new triad. This merging will be necessary due to the need to coordinate offensive and defensive components, and means of providing intelligence and compilation of information with which they are related so as to achieve the counter proliferation and deterrence objectives fixed by American reference documents – NPR, QDR and national strategy for resistance to proliferation. Thus, countries that had been connected to the command network as part of their participation to *Missile Defense* should *de facto* be committed to the process for planning and commitment of offensive conventional means of the new triad. With Washington, they should determine the degree and operational conditions of this integration, if applicable including defining how their own offensive systems could be made to participate in American counter-proliferation missions.

Apart from missile defense capabilities, they should be based on the development of the Prompt Global Strike (PGS) project, the objective of which is to be able to neutralize any target in the world in a few minutes. To achieve this, Washington would need a tailored intelligence capacity both to detect and locate objects, sites or persons and to quickly verify whether they have been satisfactorily neutralized. This involves the development of new information compilation tools (for example means introduced clandestinely on a site), and the existence of a highly reactive decision system. At the other end of the spectrum, the United States should have a few very precise missiles capable of reaching their target in a few minutes. Conversion of strategic ballistic missiles appears to be the easiest and the least expensive solution for satisfying this mission. This is the case particularly because American forces initiated research work in the 1990s so as to develop conventional warheads for their ballistic missiles (Trident, Minuteman or Peacekeeper). With conversion and development costs equal to a few hundred million dollars, the United States could have a few tens of system capable of satisfying the need by the end of the decade.

However, the development, deployment and use of these systems face strategic problems that the United States must take into account, since they are missiles that were used by nuclear forces. Although legal constraints are minimal, particularly due to the end of obligations agreed upon within the START framework, the main concern applies to the possibility of a missile of this type being fired and interpreted by Russia, and to a lesser extent by China, as a sign of a first nuclear strike. Although several elements actually limit this risk, it must nevertheless be taken into account to prevent potentially dramatic consequences. Initially, co-location of conventional and nuclear forces should be avoided, since it increases this risk. Thus, Washington should consider conversion of these missiles based on land (Minuteman and/or Peacekeeper) in priority, in preference to missiles fired from submarines (Trident). However, it should be emphasized that in the state of the American project, the conversion of a few missiles should not have any negative effect on Russia's or China's deterrence capacities due to reorganization efforts made by the Russian government and modernization efforts made by the Chinese government.

Apart from the production of national systems designed to further reduce the possibility of erroneous interpretation, the United States' priority should be to set up firstly with Russia, a new framework designed to increase transparency of its conventional and nuclear strategic arsenal, in order to replace the START treaty. A new agreement should not be sought in order to further reduce the number of weapons possessed by the two parties, but instead firstly to produce measures capable of verifying the 2002 agreement on reduction of strategic arsenals (SORT), and secondly to produce verifiable technical and functional measures designed to eliminate any ambiguity about the United States use of its offensive strategic capacities. In order to operate, they should take account of technical and operational measures taken by Washington in the short term to limit risks of erroneous interpretation (geographic separation of firing platforms, adapted paths, warheads with specific signatures). Modern communication tools that enable both parties to exchange data (and notifications) in quasi real time, should be envisaged to increase the transparency of use of their conventional means, but also to enable the United States to use their PGS capacity reactively.

In the longer term, this agreement could be extended to include related problems but with an influence on the strategic postures of the two States; tactical nuclear weapons, antimissile defenses, deterrence concepts (particularly *de-alerting*). In the present state, the objective is not *a priori* to obtain additional limitations, but rather to acquire visibility on qualitative and quantitative situations of these means and, if possible, to reach a progressive reduction on alert levels of the two arsenals.

If there is no risk at this stage due to the possibility of seeing China respond to the use of conventional strikes with its nuclear forces (unless these strikes are aimed at Chinese targets), changes in the nuclear posture of the Popular Republic are possible and could create such a possibility. Several factors could lead to the Chinese second strike concept being abandoned, particularly due to the qualitative and quantitative increase in Chinese ballistic capacities. Therefore, it would appear essential that Washington should plan to reach transparency agreements with Beijing of the same type as would be negotiated with Moscow. However, such an option is particularly complex to carry out in that, in the case of a regional conflict, the means of the new triad could be used against Chinese forces for counter attack operations. Due to competition between the two countries in the region and particularly around Taiwan, the ability of Chinese political authorities to reach an agreement with the United States that would increase transparency of the

Chinese arsenal should also be minimal. Eventually, it would appear possible to extend the dialog that has been set up between the two countries on military and strategic questions so as to include the question of nuclear postures. Such an approach would at least prevent a sudden change in China from increasing risks related to the use of conventional American strategic forces.

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