Development and Roles of Antimissile Defenses in Asia

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(This document was completed in December 2005.)
Japan, Taiwan and South Korea already possess, or are developing or searching to procure ballistic missile defense systems. Although these programs are aimed essentially at protecting the local populations, development logics and technical needs are significantly different. Nevertheless, these three States are faced with the possible outbreak of regional conflicts in which China and the United States could be opposed.

In this framework, recurrent debates are carried out on the development of national antimissile systems, focused particularly on:

- the participation of systems deployed in the States concerned with protection of the American homeland;
- the effect of cooperation with the United States on development or acquisition of this type of systems, on regional balances;
- the degree of necessary or possible coordination (and nesting) between local systems and the United States system, and the amplitude of deployments necessary to face the perceived threat in addition to systems already envisaged to protect American forces.

In particular, these questions are raised in national debates in the three countries; degree of operational independence, technical dependence, costs and feasibility, advantages of antimissile defense in case of crisis, effects on the regional situation.

Japan chose to continue its program with a degree of independence but Tokyo knows that it will have to deal with Washington at least technologically, if it is to acquire its own system one day. The Japanese government would also like to reconcile several logics; security by responding to the development of Korean and Chinese arsenals, political by strengthening links with Washington while maintaining a certain degree of decision making and economic independence, without getting involved in a program that is too expensive considering Japan’s financial capacity.

Due to this dialectic, Taiwan is in a difficult position. Although there is a vital need for Taiwan to be integrated into an American system (or at least having a few bricks so that it would benefit from American protection in case of a crisis), despite the disadvantages, Washington hesitates to propose such integration¹.

Washington’s objective is to improve the security of the Republic and to avoid a

¹ Washington’s objective is to prevent coupling between the two defense systems, by promoting independent defense of the island. See « US-Taiwan defense relations in the Bush administration », Peter Brookes, February 2003.
decision to participate in the American Missile Defense program from increasing tension with Beijing. The model selected by Taipei at the moment is the development of a solution based on a mix of national means and systems purchased in the United States. It is now important to know if the selected architecture is sufficient faced with the hundreds of missiles deployed by China on the other side of the Strait. In this respect, studies carried out by Taiwanese armed forces about the development of offensive systems (cruise missiles) would apparently confirm the intention not to base the safety of the island solely on missile defense.

Finally, Seoul is continuing to delay the choice of an American only missile defense as a solution to the ballistic threat from its neighbor, firstly for political reasons but also operational reasons. The Republic of Korea cannot entirely ignore the risk that would arise due to the development of its neighbor's ballistic arsenal over the remainder of its homeland and possibly on the American force that guarantees its security. However, the stated intention of Seoul to obtain complete independence of its forces in the case of a conflict will have a long-term effect on its capability of deploying an efficient missile defense for South Korea.

The question for Washington is to know the extent to which it should provide antimissile defense equipment for its forces deployed in the region, particularly if a conflict breaks out in the Korean peninsula, in the Straits of Formosa or between China and Japan. In all cases, American forces in South Korea or in Japan would be de facto involved; their protection should be assured in accordance with the objectives fixed in the Missile Defense program by the administration and Congress as early as 2000. Scenarios involving intervention by Beijing are now of overriding importance to define the form of such a deployment and the degree of interoperability of American systems with systems belonging to their allies in the region, led by Japan.

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3 « Lawmakers divided over U.S. wartime control of Seoul's military », Yonhap, October 10.
The Japanese defense White book published on December 10 2004 highlighted the concerns of Japanese security authorities about an attack on the country by North Korean ballistic missiles. The development of national defense capacity against this threat and eventually against threats that could be affected by ballistic developments in the Chinese arsenal, has become a political and operational priority for Tokyo.

The Japanese program will be the result of technological cooperation with the United States but should also take account of constitutional constraints (no collective defense) not enabling total integration with American Missile Defense, and financial constraints that are controlling for a program of this type. The particular geography of the country and the threat considered should also be taken into account in defining the architecture of the system. Finally, Tokyo should define operational conditions for functioning and engagement of its system depending on the cases in which Japan would be involved in regional crises to defend an ally of the United States or for direct defense of the United States⁴.

1 – **History of the Japanese DAM (anti-missile defense) program and the current state**

The first studies on development of a Japanese antimissile defense date from 1991. Tokyo, that had participated in the strategic defense initiative program (SDI), ordered five *Patriot Advanced Capability-2* (PAC-2) batteries from Raytheon to replace the Hawk systems deployed within its self-defense forces.

In 1993, Japanese manufacturers who had been associated with the IDS began a study on ballistic threats and possible responses followed by a study on possible architectures of a Japanese antimissile defense (*Western Pacific Missile Architecture Study*)⁵. Despite the fact that the threat considered was still Soviet missiles, Tokyo remained reticent about development of a capacity to defend Japan.

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⁴ See « US-Japan defense cooperation: Has Japan become the Great Britain of Asia? ».

⁵ This study was concluded in 1994 under the auspices of Mitsubishi Heavy Industries, and its results suggest the use of PAC-3 and THAAD systems.
The North Korean firing of a Nodong in the China Sea in May 1993 led Japan to consider co-development of the Theatre High Altitude Area Defense (THAAD) system, the development of which had begun in the United States. The United States proposed to launch a joint study on naval defense options for Japan. In 1994, Japan financed installation of the AEGIS system (i.e. the SPY-1D ballistic and firing control radar system) on its Kongo class destroyers.

Despite repeated requests by American administrations and pressure from its own industry, Japan did not sign a research agreement on antimissile defense with the United States until after the North Korean firing on August 31, 1998. In August 1999, Tokyo and Washington initiated a five-year technological cooperation plan for the development of some components of an exo-atmospheric interceptor. In terms of architecture, the two countries had decided to work on the development of a naval component based on the AEGIS system and the Standard Missile-3 (SM-3) interceptor.

At the end of this study, and following American revelations about the North Korean military nuclear program in 2002, the Japanese government decided to provide the country with a multi-layer antimissile defense in December 2003. This decision is reflected in the defense White book of December 2004. This White book defines the development of North Korean ballistic missiles as one of the few phenomena that directly threaten the security of the archipelago and the region in the short term, and in the longer term the modernization of Chinese missiles. The solution chosen in the White book is an antimissile defense of the country.

Two systems were selected with the objective of completing the country's defense in 2011.

Japanese self-defense air forces are to acquire short-range interceptors (15 km) in two ways: import and domestic production under license. On January 31, 2005, Raytheon, the PAC-3 system integrator, announced a contract for the production and supply of 156 missiles to the US Army at the price of 3.4 M$ each, 16 of which would be retroceded to Japan within the framework of an FMS agreement. These 16 missiles, which could only be used on one or two launchers will be deployed around Tokyo in 2006 and 2007, before national production takes over. Mitsubishi Heavy Industries (that already produced Patriots under license) will construct 200 missiles under license after signing an agreement with Raytheon, expected before March 31, 2006.

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7 The National defense program outline (NDPO) defines Japan's defense doctrine. The first directives were adopted in 1966.
10 Japan prefers this setup even if it is more expensive than a simple off-the-shelf purchase, due to maintenance problems in times of crisis, and faster updates and adaptations to Japanese needs, and also considerations in terms of jobs and support for the Japanese defense industry.
11 Foreign Military Sale.
Finally, the JASDF\textsuperscript{13} will be provided with 216 interceptor missiles in 2010, if the calendar is respected. \textit{A priori}, this quantity would be insufficient for deployment of the 16 batteries envisaged by Japan. Each battery generally comprises 3 PAC-3 launchers and 5 PAC-2 launchers, namely 48 and 20 missiles respectively (minimum per battery). Therefore, at least 768 PAC-3 missiles would be necessary to equip all 16 batteries in this configuration. The solution could be to deploy 16 batteries, only some of which would be equipped with PAC-3 and the rest with PAC-2 and the difference would be made up as time goes on by the production of PAC-3 interceptors.

Furthermore, Tokyo would like to equip its four Kongo destroyers, which are already equipped with the AEGIS system, with the Standard Missile-3\textsuperscript{14}. With this system, Japan would have a highly mobile capability designed to intercept missiles with a range of more than 1 000 km and covering the entire country.

AEGIS destroyers equipped with the SM-3 would form the first curtain of Japanese antimissile defense. Since North Korean missiles have to cross the Japan Sea, destroyers patrolling between the Korean peninsula and the island of Honshu would be ideally positioned to make interceptions\textsuperscript{15}. Furthermore, the distance to be traveled by Nodongs is about 1 000 kilometers, and part of their flight path would necessarily be exo-atmospheric. Therefore interception by the SM-3 at mid-distance would be technically possible, since these missiles are designed for interception at the end of the boost phase.

The operational configuration for a threat from the Popular Republic of China would be the same: the Eastern China Sea separates Japanese towns from all Chinese firing platforms by between at least 1 000 and 1 500 km.

The second antimissile defense curtain composed of the Patriot Advanced Capability-3 units would be used to protect the archipelago's populated areas\textsuperscript{16}.

Tokyo has begun a program to develop four FPS-XX early warning radar systems to be deployed around the shore of the China Sea by 2007. Upgrading of 7 FPS-3 radar systems is also planned\textsuperscript{17}. All these means (phased-array) should be capable of detecting ballistic missiles fired from the continent by 2010\textsuperscript{18}. In June 2005, the United States asked Tokyo the authorization to make use of data originating from these radar systems for the defense needs of the American homeland, at the time of official discussions on the common command and control architecture.

\textsuperscript{13} Japan Air Self-Defense Force.

\textsuperscript{14} Initially, one Kongo destroyer should be equipped with SM-3 by 2007, and a test is planned for 2008. See « Japan’s push for missile defense ».

\textsuperscript{15} Two of the four Kongo class destroyers have a home port on the west coast of Japan (the Kongo DDG in Sasebo and the Myoko DDG in Maizuru).

\textsuperscript{16} But not for complete protection of all of Japan. It has been estimated that more than 100 Pac-3 batteries would be necessary to protect all of Japan. See Report to Congress on Theater Missile Defense Architecture Options for the Asia-Pacific region. http://www.defenselink.mil/pubs/tmd050499.pdf

\textsuperscript{17} « Japan plans upgrade in radar surveillance against missiles launched from North Korea », East Asia Intel, 13 September 2005.

\textsuperscript{18} The detection range of modernized FPS–XX and FPS-3 radar systems would be a few hundred kilometers.
Finally, Japan has been reported to launch a program to develop a long endurance UAV equipped with infrared sensors so as to benefit from a permanent early warning \(^{19}\).

In the field of space observation of the Earth, Tokyo has engaged a major effort to acquire diverse means, since the beginning of the 1990s. They include optical and radar observation means designed for intelligence collection missions for use by the armed forces. The resolutions of the two satellites in the *Intelligence Gathering Satellites* program launched in 2003 are about 1 meter (optical) and 3 meters (radar) \(^{20}\). They are thus capable of monitoring North Korean ballistic missile activities. The launch of two additional satellites is planned for 2005 and 2006, will give Japan the capability to perform the mission permanently. A new program is already under discussion based on higher precision performances and permanent monitoring of a given site \(^{21}\).

Although the first step is to protect the archipelago against possible firing of a few Korean missiles \(^{22}\), Tokyo appears to be planning to protect its homeland against China within the renewed framework of the alliance with the United States through this project (although this has not yet been officially declared).

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\(^{19}\) *Intelligence Online*, No. 506, the estimated development cost would be 200 million dollars for two prototypes for tests planned in 2012.

\(^{20}\) « Japan breaks with tradition in launching two spy satellites », *Space and Tech*, March 2003.

\(^{21}\) « Japan starting work on new recce satellites », *Aviation Week*, January 2005.

\(^{22}\) We will see that this system is very conservatively designed to face a Korean scenario. However, its real efficiency faced with the Chinese ballistic component is uncertain.
DEPLOYMENT OF THE ANTIMISSILE DEFENSE SYSTEM (2006-2007 STEP)
PAC-3 UNITS WILL BE DEPLOYED AROUND TOKYO
THE COMMAND CENTER WILL BE CLOSE TO YOKOTA
1.1 – Financing of the Japanese program

The investment firstly agreed upon by Tokyo between 1999 and 2003 was insufficient to pay the amounts necessary for development or an off-the-shelf purchase of such a system, the estimated cost of which would be between 7 and 9 billion dollars. However, it was consistent with the policy chosen by Japan of carrying out a common evaluation of technological antimissile defense system solutions with the United States.

Starting from fiscal year 2004, financing of about 106 billion yens was voted for the project within a military budget that has been globally reducing since 2002. The 2005 budget allocated another approximately 119 billion yens (about 980 million US$) so as to continue the first part of the Japanese program. The 2006 draft budget is consistent with the logic to continue the development project for a system and for modernization of warning and command systems (see table 1).

Therefore, Tokyo appears to have chosen to finance the acquisition of a national missile defense system. Nevertheless, to enable implementation of the program, this effort will necessarily have to match the level expected by the American partner. As the latter pays the system development costs, it should in particular validate the financial equation of its cooperation with Tokyo, considering its own technical and financial difficulties. The American request for Japanese participation in research and development costs of its version of the PAC-3 worries Tokyo, since it had not passed any significant budget for this cooperation. This difficulty reveals the paradox of the Japanese approach that would like a personalized version of the American interceptor but has only committed financing for an acquisition. Without casting doubt on the Japanese program, this situation could oblige Tokyo to review the configuration of its anti-missile defense system.

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24 « U.S. Asks Japan for $545 Million », AFP, June 2005. This article highlights a wide gap between financing announced by Japan and American requests, particularly for participation in the research and development effort; See also « Japan Alarmed As Cost Of Missile Defense System With US Triples », AFP, 26 September 2005.

25 As a reminder, in 1993 the United States had estimated the development and deployment cost of an antimissile defense for Japan at 12 billion dollars. « BMD in Northeast Asia: an annotated chronology », p. 18.
## Table 1
### Financing of the Japanese Anti-Missile Defense Program

<table>
<thead>
<tr>
<th>FY begins 01 April(^{29})</th>
<th>RDT&amp;E</th>
<th>Pac-3(^{26})</th>
<th>AEGIS</th>
<th>BADGE</th>
<th>CC(^{27})</th>
<th>TOTAL MD</th>
<th>TOTAL milli(^{28})</th>
</tr>
</thead>
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<tr>
<td>FY</td>
<td>Research Development Test &amp; Evaluation</td>
<td>Land component</td>
<td>Naval estimate(^{30})</td>
<td>Air Base Ground Environment Defense</td>
<td>Command &amp; Control</td>
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<td>$</td>
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<td>1999</td>
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</tr>
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<td>2002</td>
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<td>?</td>
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<td>?</td>
<td>$41,000,000,000</td>
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</tr>
<tr>
<td>2003</td>
<td>$26,600,000</td>
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<td>?</td>
<td>?</td>
<td>?</td>
<td>$45,468,164,794</td>
<td></td>
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<tr>
<td>2004 (\text{requested})</td>
<td>$73,400,000(^{31})</td>
<td>$655,821,918</td>
<td>$464,041,096</td>
<td>?</td>
<td>?</td>
<td>$1,120,000,000</td>
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<tr>
<td>(\text{voted})</td>
<td>$534,000,000(^{32})</td>
<td>$312,000,000</td>
<td>$134,000,000(^{33})</td>
<td>?</td>
<td>$981,000,000</td>
<td>$42,234,589,041</td>
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<tr>
<td>2005 (\text{requested})</td>
<td>$127,000,000</td>
<td>?</td>
<td>?</td>
<td>?</td>
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<tr>
<td>(\text{voted})</td>
<td>$134,000,000</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>$42,234,589,041</td>
<td></td>
</tr>
</tbody>
</table>

\(^{26}\)16 batteries are planned for the long term but only 200 (built by Mitsubishi Heavy Industry) + 16 missiles (purchased from Lockheed) Pac-3 are budgeted.

\(^{27}\)Japan and the United States plan to open a Command and control centre in Yokota in 2009. The budget for construction and operation is unknown. For further details, see [http://www.japantimes.co.jp/cgi-bin/getarticle.pl5?nn20050926a2.htm](http://www.japantimes.co.jp/cgi-bin/getarticle.pl5?nn20050926a2.htm)

\(^{28}\)Japan's "Defense" budget is symbolically limited to 1% of its GNP.

\(^{29}\)Like the American system, the Japanese Defense Agency submits budget requests on behalf of each branch of the Japanese self-defense force in August every year, for the budget year beginning on April 1 next year. The approved defense budget is thoroughly investigated by the Ministry of Finance, and may or may not be modified and then ratified in December. The final and official seal is made by the vote of the Diet in March for the next tax year.

\(^{30}\)Four AEGIS destroyers (Kongo, Kirishima, Myoko, Chokai) equipped with the SM-3 interceptor missiles.


\(^{32}\)[http://www.atimes.com/atimes/Japan/FD29Dh01.html](http://www.atimes.com/atimes/Japan/FD29Dh01.html)

\(^{33}\)[http://www.atimes.com/atimes/Japan/FD29Dh01.html](http://www.atimes.com/atimes/Japan/FD29Dh01.html)

\(^{34}\)[http://www.atimes.com/atimes/Japan/FD29Dh01.html](http://www.atimes.com/atimes/Japan/FD29Dh01.html)
<table>
<thead>
<tr>
<th>Year</th>
<th>Requested</th>
<th>Voted</th>
<th>Estimated</th>
<th>Low Estimate</th>
<th>High Estimate</th>
<th>Difference</th>
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<td>2006</td>
<td>$26 856 000&lt;sup&gt;35&lt;/sup&gt;</td>
<td>$850 411 585</td>
<td>$312 000 000</td>
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<td>$1 359 680 928</td>
<td>$44 000 000 000&lt;sup&gt;37&lt;/sup&gt;</td>
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<td>2007</td>
<td>$680 077 834&lt;sup&gt;38&lt;/sup&gt;</td>
<td>$312 000 000&lt;sup&gt;39&lt;/sup&gt;</td>
<td>$143 804 448&lt;sup&gt;40&lt;/sup&gt;</td>
<td>?</td>
<td>$1 135 882 282</td>
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<td>$680 077 834</td>
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<tr>
<td>2010</td>
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<td>?</td>
<td>$992 077 834</td>
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<tr>
<td>2011</td>
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<td>?</td>
<td>?</td>
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<td>TOTAL</td>
<td>$233 256 000</td>
<td>$4 784 800 755</td>
<td>$2 184 000 000</td>
<td>$862 826 687</td>
<td>$10 471 483 442</td>
<td>$2 406 600 000</td>
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</tbody>
</table>

<sup>35</sup> [http://www.japantimes.co.jp/cgi-bin/getarticle.pl5?nn20050901a2.htm](http://www.japantimes.co.jp/cgi-bin/getarticle.pl5?nn20050901a2.htm)

<sup>36</sup> [http://www.japantimes.co.jp/cgi-bin/getarticle.pl5?nn20050926a2.htm](http://www.japantimes.co.jp/cgi-bin/getarticle.pl5?nn20050926a2.htm)


<sup>38</sup> Estimate made based on the average of expenses voted or requested in the past, not corrected for inflation (zero in Japan).

<sup>39</sup> Ditto.

<sup>40</sup> Ditto.

<sup>41</sup> Sum (m) + (n) + (o)


Given by the IISS as being the cost of Patriot Pac-3 and installation of SM-3 radar systems and missiles on the four Kongo class destroyers. This estimate appears to be low.

<sup>43</sup> $4 784 800 755 + $2 184 000 000 = $6 968 800 755 namely all acquisition costs.

<sup>44</sup> Evaluation of the global long-term effective cost of the antimissile defense for Japan.
1.2 – China and Japanese antimissile defense: the gap between statement and reality

China, through its official representatives and its academic community, repeatedly states its anxiety about the deployment of a Japanese missile defense integrated in the United States system. In particular, Beijing mentions the risk of seeing such a project destabilize regional equilibriums and hinder arms control efforts. China in particular has been opposed to any renegotiation or abandonment of the ABM treaty. Starting in 1999 and until 2001, it worked with Moscow to co-sponsor a resolution by the United Nations General Assembly recalling « the important role of the treaty in maintaining strategic stability »\(^\text{45}\).

The five arguments on which the Chinese official position is based are\(^\text{46}\):

- the impact of missile defense on its deterrence;
- the concern of seeing Taiwan integrated or protected by an Asian missile defense system;
- the role of missile defense as a means of American domination in Asia;
- the effects of abandoning the ABM treaty on the international arms control policy
- the possible influence of a Japanese antimissile defense program on Tokyo's military position.

Since the American withdrawal from the ABM treaty, the Chinese position appears to have moved towards the possible deployment of a system in Japan. The announcement by Tokyo of a program launched in 2003 (confirmed in 2004) was not followed by a declaration by the Chinese authorities. Although Beijing continues to be hostile to integration of Taiwan into such a system, Japanese projects no longer seem to disturb the Chinese authorities.

The cause for this change of attitude appears to be firstly the lack of reaction from Moscow about the announced American withdrawal from the ABM treaty. From Beijing’s point of view, Moscow has effectively negotiated conditions for withdrawal with Washington (the Moscow 2002 agreement on the nuclear parity). In fact, with hindsight, Moscow's public opposition to renegotiation of the ABM treaty until 2001 appears to have been solely tactical.

China also considers that deployment of the US Missile Defense does not really affect its deterrence\(^\text{47}\). It seems probable that Beijing considers that systems and architectures developed by the United States are not likely to neutralize its future ballistic missiles. In the context of modernization of its nuclear facilities, China is probably developing new means of penetrating antimissile defenses (decoys and penetration aids, multiple warheads, increase in the number of missiles).

\(^{45}\) « BMD in Northeast Asia: an annotated chronology », p. 65.
\(^{46}\) « China debates missile defence », pp. 125-128.
\(^{47}\) In particular see « China debates missile defence », p. 129.
timescale for deployment of such systems is sufficiently short compared with the deployment of American antimissile systems for Beijing to consider that its offensive capacities are capable of countering any antimissile defense deployed by the United States in the long term.

Finally, positive changes in political and economic relations with Washington since 2001, and to a lesser extent with Tokyo, have led China to avoid some sensitive subjects in the bilateral relation. Particularly because in terms of missile defense, Chinese leaders have not failed to analyze that the American administration and its Japanese allies apparently cannot be dissuaded from continuing development of new systems and proceeding with the deployment of available systems. Faced with the inevitable aspect of the American plan, Beijing has apparently chosen to stop a policy of public criticism that could indirectly create questions about its own dissuasion tool.

1.3 – Internal political conditions for deployment of an antimissile defense

Prime Minister Koizumi has made a firm commitment to create a national missile defense system, and there is no organized opposition to this project. The Japanese problem is actually based on the conditions for this deployment and in particular the compatibility of integration with the American system with the law, feasibility of cooperation for development of a system and protection of the American homeland by Japanese means. The antimissile defense project would also extend the role of the American nuclear umbrella as a guarantee of Japan's security in the long term.

In October 2004, the Japanese Prime Minister council for security and defense capabilities highlighted the need to initiate cooperation with the United States to produce an antimissile defense, in a report prefiguring the White book. This cooperation implies a relaxation of the Japanese policy on exports of military equipment. In this respect, a decision has already been made and announced at the beginning of 2005 in the form of an exception to export control rules related to antimissile defense equipment only.

Continuation of the reform of the role of the country's self-defense forces was also mentioned as being a mean of assuring the security of the country in a post-Cold war environment. This approach forms part of the Japanese intention to normalize the role of its forces as a military tool. In terms of missile defense, this reform is intended to enable greater integration of Japanese means into the American system. Renewal of the alliance between Tokyo and Washington, partly through the missile defense program, finally provides guaranteed access of American forces to the Asia-Pacific theater.

48 The Japanese main opposition party is ambiguous about the acquisition of such a system (and cooperation with the United States), but so far without opposing the budgets proposed by the Prime Minister. However, it is opposed to adoption of the July 22 2005 law relaxing the conditions for engagement of antimissile defense (see below). « Japan-US cooperation on missile defense: issues and prospects », Congressional Research Service, March 2002, p. 17.

The debate is now focused on the question of use of Japanese antimissile defense and early warning means:

- Firstly, can Japanese antimissile defense means be engaged in defense missions for another country in the region (or even outside the region)? The answer given in the December 2004 in the White book is that Tokyo will reinforce « operational cooperation with the United States, including in the area around Japan »\(^{50}\). This apparently ambiguous response suggests a broadening of the Japanese action area. Such an interpretation is strengthened by the February 19 2005 common declaration in which the two countries confirm their role in terms of security in the pacific region\(^{51}\).

- Secondly, can the Japanese defense system directly participate in the defense of American homeland? This question is far from being answered. The Japanese intention to improve operational cooperation with the United States in terms of antimissile defense undoubtedly preconfigures a large degree of integration. Nevertheless, it appears unlikely in the current state of the internal Japanese debate that a total integration\(^{52}\) of the two systems can be envisaged.

### 2 – Degree of independence of the Japanese DAM system in the American MD

#### 2.1 – Japanese architecture

The Japanese program for acquisition of an antimissile capacity is based essentially on the development of land and naval systems in cooperation with the United States. Tokyo now needs to design the architecture that will assure coordination of these systems to protect the entire country. The corresponding planning effort has already been made.

The two systems perform complementary missions. AEGIS must enable a first engagement of threats in the extra-atmospheric space (even during the propulsion phase) over the entire country. PATRIOTs cover less extensive areas (point defense) and provide an interception capacity against missiles that have passed through zone coverage.

Apart from the intrinsic capability of each means, optimization of the chances of destroying attacking missiles depends on:

- transmission of warning data to all available systems;
- coordination of firing (mutual positioning of systems, engagement of several attacking missiles, engagement policy);
- sharing of data related to engagements between the systems concerned.

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\(^{50}\) In other words the Eastern Asia-Pacific region. « National Defense Program Outline, FY2005- », p. 6.

\(^{51}\) See point 10 in the common declaration of the U.S.-Japan Security Consultative Committee.

\(^{52}\) In other words a common command, transparent transmission of all warning data, common engagement rules.
These missions must be performed by the command and control system that Japan will choose. But such a system suitable for the structure of Japanese self-defense forces does not yet exist. However, it should be set up starting from 2006.

Land air defense is integrated into the Air Force within a command that controls six *Air Defense Missile Groups*. It is structured around a system called BADGE\(^\text{53}\) that coordinates the country’s ground-air defense (radar warning and airborne warning means, batteries). This command system has the mission of collecting data from early warning means in the Japanese Air force and breaking them down into commands for each air region.

AEGIS destroyers are integrated into the *Fleet Escort Force* under the command of the self-defense fleet. For Kongo destroyers, the Navy should be able to use the *Cooperative Engagement Capability* system\(^\text{54}\) for coordination of firing from these ships.

Merging of the Navy and Air force command systems has been presented as being a priority for the Japanese Defense Agency since the 2004 *White book*. In this respect, modernization of the BADGE is planned in the antimissile defense program so as to make a Joint Armed Forces command loop\(^\text{55}\). This new system would emphasize coordination with American means and between components of the Japanese architecture. However, development of a particular command and control system for the Navy would slow down implementation of a common architecture based on a single command loop. Furthermore, merging of navy and air data and components could be made more difficult due to the lack of a common doctrine and operational concept\(^\text{56}\).

Yet the creation of a Joint Armed Forces command in terms of antimissile defense has already been planned by the Japanese authorities\(^\text{57}\). The decision to create a joint staff based on the American *Joint Chiefs of Staff* model also illustrates the Japanese will to unify command of its armies for some missions including antimissile defense\(^\text{58}\). **In short, the project will accelerate the creation of a Joint Armed Forces capability which is the basis for a modern military force.**

### 2.2 – Relation between Japan and the United States in terms of command and control

Japan and the United States have two specific command structures, each of which depends on national systems (*Pacific Command* for the United States and JDA for Japan). Air defense command structures are co-localized. The United States has teams (*Theater Control Operations Team*) installed within Japanese operation centers.

\(^{53}\) *Base Air Defense Ground Environment*.

\(^{54}\) American system of sharing warning data between ships.

\(^{55}\) Deployment of the new system called the *Japan Aerospace Defense Ground Environment* should being in 2006. « Network centric warfare: it’s implication for Japan Self-defense force », p. 11.


\(^{57}\) « Japan’s view for future security and defense capabilities », p. 51.

\(^{58}\) [http://www.japantimes.co.jp/cgi-bin/getarticle.pl?n=20030830a2.htm](http://www.japantimes.co.jp/cgi-bin/getarticle.pl?n=20030830a2.htm)
They transmit information to the BADGE structure and coordinate operations. American planning allows for two cases in case of crisis:

- Integration of the two systems in the form of a single operations command structure, highly automated due to the constraints of the ballistic battle.
- Possibility of operating outside Japanese structures. In particular, American forces in Japan reserve the possibility of performing alone operations in which Tokyo would refuse to participate, from their deployment areas.

Existing structures will have to be merged to achieve the necessary integration of antimissile defense command and control systems publicly required by the Japanese government, in other words:

- Mutual, automatic and immediate access to early warning data. Several technical and political difficulties can already be foreseen. On the American side, the reticence to supply data directly from these warning means is undoubtedly due to technical concerns (compatibility with the American processing system) but also political questions (confidentiality of some American capabilities or data, lack of a Japanese decision on use of its resources for the benefit of the United States). Note that the American request to obtain data from the Japanese FPS radar systems has not yet been answered. However, setting up a shared early warning system for the region is possible and could form the first step in merging of American and Japanese antimissile defense systems.
- Setting up a single command center for antimissile defense in the Pacific. This part of the merger means setting up common rules of engagement. Seen from Washington, logic would suggest that American means in theaters (AEGIS) directly participate in protection of the United States homeland as well as allied countries. For time reasons, American regional command has the freedom to engage its means without directly referring to the national political system. Since the vote of the Japanese law on July 22, 2005, air defense force command is authorized to use its own organizational means in the same way, even if it must refer to the national system afterwards.

This law considerably relaxes conditions of use, by enabling the head of the Defense Agency to:

- Deploy available systems if an imminent missile attack threat is detected and authorize an interception if it materializes. The Prime Minister's prior agreement must be obtained before obtaining the fire delegation.

60 « The challenges of maintaining US-Japan security relations after the cold war », p. 7.
61 « Collective-defense ban seen keeping Japan out of missile first-alert loop », The Japan Times, 10 June 2005.
63 Such a system could resemble the NATO « shared early warning » through which the Alliance’s air defense forces use American warning data supplied by the Strategic Command.
64 In other words in this case, the command in chief of American forces in Japan under the authority of PACOM for regional coordination.
65 See « Deploying Missile Defense: major operational challenges ».
66 « Japan lower house oks bill to expedite missile defense », People’s daily online, July 2005.
Authorize an interception if firing is detected with no precursor signs according to emergency directives approved by the Prime Minister.

The draft law was the subject of strong opposition by the Japanese democratic party (opposition) that wanted the Diet to be solely capable of authorizing the use of antimissile defense means. This draft law is likely to favor setting up partial integration of the two systems, in terms of coordination of functional approaches of the two countries.

However, existing constraints are difficult to reconcile and oppose merging of the entire command system for the first deployments of the Japanese system. It appears only feasible to include some technical functions in the decision loop (warning, harmonization of the air situation).

In this respect, in the next few years, Tokyo should continue to make its forces more independent, particularly in terms of intelligence and command. Thus, setting up a common air command center in Yokota should be accompanied by special agreements on sharing of intelligence data. This political will for independence, that already appeared in pursuing a national program for military observation satellites, is probably the main obstacle to pure and simple merging of the Japanese system into a global antimissile defense.

3 – Operational policy

Until the NDPO was adopted on December 10 2004, the two forces that might be concerned by antimissile defense were dedicated essentially to defense of the homeland and sea and air approaches against a possible invasion attempt of the country or a threat to shipping control lines. Without fundamentally modifying the content of the mission of self-defense forces, the 1995 White book was intended to enable them to participate in international missions under the auspices of the United Nations in accordance with the law voted by the Diet in June 1992.

They are placed under the direct authority of the Prime Minister and the Diet, and are almost completely independent operationally and for their missions. The air self-defense force responsible for air defense and ground-air defense, must defend the country against all types of air attacks. Naval forces are responsible for the defense of naval approaches. Air defense means in naval forces participate only in self-defense of ships in the fleets.

3.1 – Operational constraints

Introduction of a missile defense system should lead to a change of operations concepts in the two forces, so as to perform the new mission fixed by the political authorities. Operational choices depend on coverage of the country assured by the

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67 Minimization of times between firing and the American interception decision, and defense of the homeland and national and allied means. Non-participation by Japan in defense of the United States or a third party nation.


69 Maritime Self Defense Force (MSDF) and Air Self Defense Force (ASDF).
planned systems (PAC3 and AEGIS), the extent of the missions that will be applied to the antimissile force (for example the case for external operations), the number of interceptors available at a given moment and firing rules selected by the political authority.

The Air force should have 16 PAC-3 batteries by the end of the program, each including a launcher\(^{70}\) deployed along the entire western façade of the archipelago. Each launcher can protect an area the size of a city\(^{71}\). The choice of defended areas in itself depends on a political rather than an operational decision. In any case, considering the population density of the country, PAC-3 batteries will provide protection to some cities. The protection provided by the first PAC-3 missiles starting from 2006 should be limited to Tokyo.

The four AEGIS ships in the naval component should be capable of covering the entire homeland. However, note that for maintenance reasons, only two of its ships will be permanently operational, while the other two can be urgently deployed to face a demand\(^{72}\). The lack of one or two ships would not affect the zone coverage, but it would directly affect the capability of the component to intercept attacking missiles by making it more complex to choose positions for the available ships. Hence, the deployment of ships for external operations could be difficult in terms of coverage of the homeland.

The stock of interceptors appears sufficient to face a salvo of several tens of missiles (for China) and more comfortably, a few North Korean missiles attacking the homeland. On the other hand, in a scenario of a high intensity ballistic engagement (Taiwanese crisis), one or two AEGIS would only provide limited coverage in time and space, particularly because their vulnerability faced with an anti-ship threat prevents them from being fully mobile.

3.2 – Definition of an operation concept

The operation concept of the antimissile defense system\(^{73}\) for protection of the homeland depends on the existence of political-military directives validated by the political authorities in the country. In particular, these directives must specify conditions of engagement of naval systems\(^{74}\) and priorities (or missions) of use. Considering the analysis of Japanese priorities, it could be supposed that these directives would be based on the following lines:

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\(^{70}\) See above, it is improbable that each battery will have more than one launcher considering the number of missiles ordered.

\(^{71}\) Defended areas depend strongly on the range of the attacking missile; the defended area becomes smaller when the range increases. It can be estimated that the coverage of each PAC-3 launcher against a missile with a range of 1 000 km is of the order of about a hundred square kilometers.


\(^{73}\) The boundaries of the concept described here take account both of technical and operational constraints that emerge from the elements mentioned above. Note that no detailed study on the subject has been found in public literature. Elements appearing in the « Ballistic Missile Defense for Japan » (pp. 89-94) report appear to be consistent with this approach.

\(^{74}\) \textit{A priori}, risks of overlap are small for land systems, each defending a specific area.
systematic interception of any ballistic missile (1) threatening population centers, 
(2) essential infrastructures (energy\textsuperscript{75}, telecommunications, decision making 
centers, hospitals), (3) essential military means (command centers, aviation, etc.);
non-interception of missiles not aimed at the homeland without prior political 
authorization;
real time report on progress with the ballistic battle to political authorities.

The main mission of a command unit responsible for coordinating engagements of 
the two components and reporting on progress with the antimissile battle to the 
political authorities has already been mentioned. This unit should in particular 
perform the following missions:
compile and transmit data to other components of antimissile defense, to self-
defense forces assigned to passive protection, and to political authorities;
continuous evaluation of changes to the ballistic battle and coordination of firing 
(assignment of available means as a function of the reciprocal configuration of 
the threat and available interception means; volume, assumed impact point, 
approach vectors).

Coordination with American systems is also necessary. Since the two command 
systems are independent in terms of engagement decisions, assignment of resources 
of each nation will have to respect a few guidelines:
economy of interceptors to prevent duplicate engagements, which could reduce 
the defense capacity in the long term;
mutual knowledge of attacking missiles engaged and non engaged by the 
resources of each country.

Japanese command should also consider degradation of the operational capacity in 
the case of an external deployment of AEGIS ships. It will have a particular impact if 
Japanese land is threatened, in other words within the framework of a regional 
conflict (Taiwan and to a lesser extent Korea). Maintaining a homeland defense 
capability will be directly related to the availability of the AEGIS fleet that, as we 
have seen, is 50% under normal conditions. In this case, and for a crisis in Taiwan, it 
would seem improbable that Tokyo would send one of its ships into the conflict area 
because such an approach would strongly reduce its own homeland defense 
capability. However, in the Korean case, Japan could choose to send one of its 
AEGIS towards the west and this would maintain an appropriate coverage level.

3.3 – Conclusions
Availability of the naval component, essential for protection of the entire 
archipelago, is still the weak point of the Japanese system. The defense capacity 
would be strongly reduced if one or several Kongo destroyers were sent for external 
operations. The vulnerability of Japanese destroyers faced with anti-ship missiles, 
and particularly Chinese missiles, could also weaken the antimissile defense.

\textsuperscript{75} Nuclear power stations in particular. See « Marshal Kim Jong II’s war plan ».
This is particularly true because the system forming the low layer only covers a few sites and therefore would be incapable of efficiently protecting all critical Japanese infrastructures.

Firing of missiles towards Japan along some flight paths could also make the Japanese-American coordination capacity difficult by increasing the time necessary to determine the flight path and the impact point of the missile. In fact, the uncertainty on the target (United States or Japan) would have to be cleared before Tokyo would decide whether or not to engage its systems in accordance with its political obligations.

In conclusion, despite its operational weaknesses, the Japanese system would be capable of efficiently fulfilling its mission to protect the Japanese homeland in the medium term. The scenario of a limited confrontation with China is the most difficult for Tokyo because this scenario may take advantage of the weaknesses of inter-allied coordination and the vulnerability of some resources, and could severely reduce the efficiency of the Japanese antimissile defense. Penetration capacity of Chinese missiles and the existence of a modern arsenal of anti-ship missiles could defeat the system envisaged by Tokyo. However, remember that before Chinese forces are in a position to make efficient use of available offensive means, they must have efficient intelligence collection systems so that they are not obliged to oversaturate the chosen targets due to the lack of reliable data about damage by attacks. Furthermore, even in the limited scenario selected, there is a risk of escalation between China and the United States.

The Japanese system is conservatively designed for the case of a conflict against North Korea, but appears less capable of performing its role in the case of a modernized Korean arsenal that could be developed following unification of the two Koreas.
There is no doubt that the Republic of China (Taiwan) is facing a serious and real ballistic threat. As demonstrated by the May 1996 "tests" and the continuous build-up of its tactical ballistic arsenal, Beijing has the means of inflicting severe damage on the island in the case of war. It is not impossible that these missiles could be used to obtain political effects, for example in the scenario of a Chinese blockade of the island in order to squeeze Taiwanese political authorities.

In 2005, China had more than 700 missiles with a range of between 300 and 900 km deployed within range of Taiwan, under the operational responsibility of the second artillery. The rate at which this arsenal is building up is of the order of several tens of new missiles per year.

The Taiwanese position faced with this threat remains ambiguous, and recurrent debates have been held on setting up an antimissile defense, dealing with the financial and technical feasibility and political effects towards China. The recent vote of the Taiwanese Parliament defense commission in favor of canceling the order of PAC-3 missiles from Raytheon could be a symptom of the lack of any real consensus within the political class on this question.

Similarly, Washington should attempt to fine tune the degree of cooperation with Taipei on antimissile defense. The American policy of support for pacific reunification between the two Chinas ("one China policy"), and the will to allow Taipei to take more control over its own defense in the future has already led the administration to renounce integration of Taiwan into the missile defense system. However, the American administration has decided to provide Taiwan with the bricks necessary for the design of a national antimissile defense system, to contribute to Taiwanese security.

1 – A budding capacity

The Taiwanese approach to antimissile defense is unique due to the existence of a technical, financial and operational debate on the usefulness of this type of system.

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77 « Taiwan legislature torpedoes Patriot Missiles », Taiwan Government Information office, 10 November 2005.
Although it has been clear that there is a real ballistic risk for the security of the island since the Chinese "tests" in 1996, the choice of solutions to this problem is more uncertain that ever.

1.1 – *The relevance of an antimissile defense forms a central element in the debate on Taiwanese security*

Several obstacles are slowing practical implementation of a Taiwanese antimissile defense system.

Firstly, budget constraints oblige the Ministry of National Defense (MND) to define its acquisition policy cautiously. Thus, the vote of a specific budget for acquisition of PAC-3 batteries from Raytheon was put back several times so as to study performances of the system better

Furthermore, opponents to acquisition of a system highlight its cost-efficiency ratio faced with a Chinese threat consisting of several hundred missiles. In particular they emphasize the need to defend all of a relatively wide and densely populated territory rather than just a few areas in it. But to satisfy this need, a missile defense must include a large number of exo and endo-atmospheric interceptors to prevent Chinese saturation firing from penetrating it. Furthermore, a complete architecture must be based on an efficient early warning and command network which, from the point of view of the opponents, requires the acquisition of additional systems from the United States.

The problem of short-term availability of technical solutions adapted to the Chinese threat then arises, if it is considered that this threat could materialize quickly.

Therefore these opponents believe that other options should be studied in order to reply to the Chinese ballistic threat. They consider that the development of an efficient and credible offensive capacity based on a land attack cruise missile system should be preferred over the development of an antimissile system. The objective with such a development would be to set up a deterrence capacity towards Beijing, and particularly to obtain the means of carrying out counter-force actions on Chinese launchers to reduce the missile salvo size.

Supporters of setting up an antimissile defense system for Taiwan do not criticize the above analysis, but they emphasize the need to reassure the population who would massively support the deployment of such a defense. From their point of view, deployment of an antimissile defense would complicate Beijing’s use of its ballistic missiles by introducing a doubt about the effectiveness of any strikes.

Apart from the debate between experts, deployment of a missile defense is also at the heart of a political confrontation between the Democratic Progressive Party (in power) and the Kuomintang (KMT). The KMT uses the results of the March 2004

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referendum to justify opposition to setting up an antimissile defense of the territory\(^82\), particularly because Taiwan has to acquire some components from the United States in order to achieve antimissile protection, and the KMT is continuing to question management of the budget for the island’s military procurements from Washington\(^83\). This opposition is now hindering possible deployment of the system in the country and could jeopardize its future if there is a new political alternation.

Therefore uncertainty in Taipei about the architecture and conditions for deployment of a possible missile defense partly explains the lack of a structured acquisition program. But it is also the result of the difficulty in defining the desirable level of integration with the American system, to the extent that it must find a compromise between several constraints that are difficult to reconcile:

- increase the degree of Washington’s involvement in the security of the island by creating the best possible conditions for making American intervention as systematic as possible in the case of a war with continental China;
- obtaining a sufficient degree of independence to be capable of assuring its own defense in the first weeks (or days) of such a war;
- avoid an excessively visible merger that could cross Chinese red lines\(^84\), and thus cause a crisis with Beijing.

\(^82\) This referendum asked the population about the need to acquire an antimissile system to face the Chinese threat. It was not validated because participation was less than 50%.
http://www.state.gov/r/pa/ei/bgn/35855.htm


1.2 – An acquisition effort with no overall project

The antimissile defense capacity of Taiwan was at a very early stage in 2005. It was based on a heteroclite mix of means purchased in the United States and systems developed locally under the responsibility of the Chungshan Institute.

In 1997, Taiwan purchased the Modified Air Defense System (MADS) from Raytheon, consisting of three Patriot Advanced Capability-2 batteries. MADS provides Taiwan with a first point defense system, designed to protect Taipei in priority against an attack by short-range Chinese missiles. Each battery comprises 8 launchers each equipped with 4 missiles, namely a firing capacity of 96 missiles out of a total inventory of 200 PAC-2 missiles at any given time. However, it should be emphasized that the efficiency of this system is low against ballistic missiles, and the successful interception ratio is between 10 and 20%.

In order to complete its inventory of PATRIOTs, Taipei started to develop a local system called Tieng-Kung II (or Sky Bow-II) in 1997. This missile, deployed on a fixed site, was apparently tested against ballistic targets in spring and then in summer 1998. The most recent test of the interceptor was in May 2005, and could prefigure an operational deployment.

The limited performances of these systems, like the absence of national detection and early warning, have encouraged Taiwan to initiate discussions with Washington starting in 2000 for the acquisition of several antimissile defense systems.

Thus, President Bush approved a direct sale of 4 Kidd class destroyers to Taipei in 2001. The Taiwanese Parliament voted a budget of about 800 M$ in 2003 and the destroyers should be delivered, after reconditioning, starting from 2005. Although this sale is not significant in terms of antimissile defense since the ships were not a priori equipped with DAMB means, it is a possible precursor to the transfer of AEGIS systems.

Washington's decision in this subject was apparently at least partly justified by doubts about the capability of Taiwanese forces to efficiently operate modern naval systems. Thus according to D. Swaine, the sale of Kidd destroyers would provide an opportunity to train Taiwanese forces possibly before transferring more modern ships. The sale of 4 Arleigh Burke class destroyers equipped with SPY-1D radar

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85 A priori, this is the version of the Patriot developed during and after the Gulf war.
86 http://www.fas.org/irp/world/taiwan/army-inventory.htm
88 http://www.globalsecurity.org/military/world/taiwan/skybow-2.htm
89 This was an FMS sale between the American Navy and Taiwan. CRS Report for Congress, « Taiwan: major US arms sales since 1990 », p. 6.
90 Two have already been delivered. « Taiwan takes delivery of two Kidd-class destroyers », Jane's defence weekly, November 2 2005.
systems and SM-3 missiles could then take place as early as 2010 for an estimated cost of 4.8 billion dollars\textsuperscript{91}.

In 2001, bilateral discussions were also held on Taipei’s purchase of six \textit{Patriot Advanced Capability}-3 batteries. Since this date, the Taiwanese administration has engaged a budget process in order to identify and release financing necessary for this operation. A special budget of 4.3 billion dollars that encompasses several acquisitions from the United States\textsuperscript{92} was proposed for adoption in Parliament in 2005. But long debates are currently being held within the legislative Yuan and it could only be partially adopted. The six batteries, each \textit{a priori} comprising three 16-missiles launchers, would then complete the coverage of the island, being deployed in the center of the island.

The acquisition of early warning began within the framework of the Surveillance Radar Program carried out by the Clinton administration to increase Taiwan's early warning capability. This program should also enable Washington to substitute a warning and monitoring system in the short term to replace the supply of the AEGIS system requested by Taiwan (for aerobic and ballistic threats). After a technical review by the Taiwanese authorities, the choice was made for the supply of two detection and tracking systems using two FPS-115/PAVPAWS radar systems transferred in the form of a direct sale (FMS)\textsuperscript{93}. A first system could be installed in Taiwan as early as September 2009\textsuperscript{94}. The US Air Force chose the Raytheon Company in June 2005 to build the system for a total budget of 752 million dollars.

Despite a relatively ambitious acquisition program, the wishes of the Taiwanese administration to acquire an antimissile defense are still affected by technical and operational weaknesses. In particular, the definition of the general architecture of the system is still in a conceptual phase and it is difficult to imagine that this phase could be terminated before the end of the decade\textsuperscript{95}. In particular, its practical implementation requires firstly that the various armed forces concerned (Army and Navy) should be capable of operating in common and efficient operational structures.

\textbf{1.3 – Particular difficulties related to Taiwan’s antimissile defense}

Even if Taiwan's geographic situation does not impose such severe constraints as South Korea in terms of antimissile defense, the distance between the island and the continent and the population density have to be taken into account in terms of architecture.

Taiwan has a population of 23 million inhabitants\textsuperscript{96}, and is one of the most densely populated countries in the world (about 600 persons per square kilometer\textsuperscript{97}).

\textsuperscript{91} Ibid, p. 8.
\textsuperscript{92} Including Orion P3-C patrol aircraft.
\textsuperscript{93} http://www.globalsecurity.org/military/world/taiwan/air-defense-over.htm
\textsuperscript{94} « Taiwan to get US early warning radar », Reuters, November 2005.
\textsuperscript{95} See the chapter dealing with the modernization of the Taiwanese command system.
\textsuperscript{96} More than 6 million Taiwanese live in Taipei.
\textsuperscript{97} http://8thicoc.ntou.edu.tw/taiwan.htm
Therefore, the missile defense system should cover the whole island to enable satisfactory protection of the population.

The nearest Chinese missile bases are about 300 km from Taipei\(^98\). Furthermore, these are support sites intended for ballistic missiles on mobile launchers that could therefore be brought close to the coast for firing if required. The time necessary for an M-9 type missile with 600 km range to reach Taiwan is about 10 minutes. These missiles that have an apogee of a few tens of kilometers can only be intercepted by endo-atmospheric interceptors (type PAC-3).

Taiwan would need at least ninety PAC-3 launchers to protect the island’s 36 000 km\(^2\) \(^99\). Therefore systems for which acquisition has been planned for the year 2010 could not provide total protection of the island under any circumstances, all they could do is to protect the two main cities, Taipei and Kaohsiung.

The size of the Chinese ballistic arsenal and the capability of the second artillery to fire consecutive salvos of several tens of missiles also form constraints that will make antimissile defense of the island difficult. Beijing has more than 150 M-9 and M-11 launchers\(^100\) at the moment, so that in theory it could saturate the Taiwanese antimissile defense system as it is planned at the moment.

Finally, note the vulnerability of the means envisaged by Taiwan to neutralization strikes by cruise and/or ballistic missiles. This will be the case particularly for the early warning radar, which is an obvious target for Chinese missiles considering its size and the crucial role that it is expected to play in the defense system.

### 2 – The dilemma of the Taiwanese antimissile defense

The Taipei government is not the only source of hesitation surrounding implementation of a possible antimissile defense project in Taiwan. Washington is analyzing the extent of its support to the Republic of China, taking account of several factors; consequences on the development of relations with Beijing, the desirable level of integration into the American system, Taiwan's capability to finance the project, capability of the Taiwanese army to implement a complete system.

#### 2.1 – The Chinese position

Beijing frequently mentions its opposition to including Taiwan in a foreign system and to providing Taipei with an antimissile defense system\(^101\). This position reflects the two main red lines of the Chinese political and military position with regard to Taiwanese antimissile defense projects:

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\(^98\) See appendix 2 for details of Chinese bases and flight times of the missiles concerned.

\(^99\) Based on the assumption that every battery covers about 400 km\(^2\).

http://www.cndyorks.gn.apc.org/yspace/articles/bmd/taiwan_md_show.htm

\(^100\) International Institute for Strategic Studies, « Military Balance 2004-2005 ». China probably has 4 DF-11 brigades (with 32 launchers) and 2 DF-15 brigades (with 24 launchers).

\(^101\) « Beijing warns US against missile help for Taiwan », AFP, September 2005.
Deployment of a system will increase security ties between Taipei and Washington, to the extent that the United States would be obliged to guarantee security of the island in any war involving the use of ballistic missiles. Seen from Beijing, such a situation would give Taiwan the freedom to break the existing status quo to confirm its independence.

The supply of efficient antimissile defense systems to Taiwan reduces the usefulness of the Chinese arsenal of ballistic missiles, both in terms of operational efficiency and as a coercion means. In this respect, as mentioned by D. Rice, Beijing’s reaction will depend particularly on the type of system supplied to Taiwan. Thus, the transfer of modern missile launching destroyers (Arleigh Burke class) with a greater impact on Chinese military capabilities could trigger a crisis between Beijing and Washington. Firstly, with several ships of this type, Taiwan would have warning, command and interception capabilities, and possibly even sufficient counter-force capabilities to efficiently protect Taiwan from Chinese missile strikes over a fairly long period. Furthermore, these ships that could also carry out submarine warfare and air defense operations would make a direct contribution to eventually maintaining the equilibrium of naval forces in the Strait despite modernization of Chinese capacities.

Nevertheless, it is still difficult to judge what Beijing’s reaction would be if Washington crosses one of these red lines. For example the transfer of PAC-3 authorized by the Bush administration in 2001 did not lead to any visible inflection of the Chinese attitude either internationally or bilaterally.

Nevertheless, Beijing does have some means of applying pressure on the United States. Apart from exploitation of the economic and financial relation between the two countries, China could also threaten to strengthen its transfers of sensitive materials to proliferating countries or it could exploit the North Korean crisis in an attempt to apply pressure on Washington.

On the other hand, the modernization process of its arsenal of tactical missiles does not constitute a negotiation tool for China. It appears completely decorrelated from the deployment of antimissile defense in Taiwan and consequently should continue, as would also continue the strengthening of the Chinese capacity in terms of precision strikes (cruise missiles).

2.2 – The American approach

The attempt to maintain the existing status quo between Taiwan and the Continent continues to be the foundation for American policy towards Taiwan. Political developments in Taiwan since the beginning of the 1990s and particularly the democratization that has demonstrated its worth since the 2000 government change,

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102 It can be considered that Chinese ballistic missiles would have a role to play in all conceivable wars in the medium term.
103 Chinese missiles have a coercion and an operational role.
and modernization of the Chinese military disposition, have led recent democrat and republican administrations to reinforce the security link between the United States and Taipei\textsuperscript{107}.

This reconciliation has already resulted in unprecedented commitments by the administration and Congress for authorizations for delivery of systems that could participate in the antimissile defense of the country. Even if the supply of AEGIS destroyers is pushed back to 2010, no doubt in an effort to respect Beijing's susceptibility, it is improbable that the next administration will modify this decision.

Less spectacular but equally significant, the supply of an early warning system is accompanied by installation of the first elements of what could eventually become a Taiwanese command network for antimissile defense (processing and communication means) capable of providing an interface with weapon systems and possibly with the American warning system\textsuperscript{108}.

But seen from Washington, the main effect of reinforcing the security link is to transfer important responsibilities to Taiwan. In particular Taipei must be capable of maintaining its own security during the first days of a war without assistance\textsuperscript{109}.

During this period, it appears realistic to think that the mission of Chinese forces would be to make Taiwan capitulate before the arrival of American and allied forces. This would mean the massive use of tactical ballistic missiles in the early days of such a war.

American fleets transit times depend both on their geographic proximity and on the local logistic capabilities. Thus, forces stationed in Japan could reach Taiwan in less than 2 days, forces located in Guam would take 2 days and the remainder of the Pacific fleet in Pearl Harbor less than a week. These transit times assume that these means have already received early warning. Furthermore, anti-access capabilities and tactics developed by Chinese forces could significantly increase access times to the theater for some American ships\textsuperscript{110}.

The need for the United States to set up a credible Taiwanese resistance capability implies continuation of the effort started by Taiwan in 2000 to modernize equipment and structures of forces. More particularly, concerning the antimissile defense, it is essential that a command and control network should be set up including coherent systems to avoid the occurrence of rupture scenarios\textsuperscript{111}. As emphasized by Peter Brooks, this capability must not be focused on the production of a single broadened air defense system against the ballistic and aerobic threat, and not solely on antimissile defense. It assumes firstly a genuine structural reform of the Taiwanese

\textsuperscript{107} J.-P. Cabestan, « Chine-Taiwan: la guerre est-elle conceivable ? », pp. 175-178.

\textsuperscript{108} Doug Nairne, « On the defensive, a Taiwan missile defense choice », \textit{The South China Morning Post}, July 11 2005.


\textsuperscript{110} « China may have upper hand in five years », \textit{Taipei Times}, November 30 2005.

\textsuperscript{111} For example, decapitation strikes on the Taiwanese political system. Ibid, p. 7.
Army involving the creation of a technical body (like French and American non-commissioned officers) capable of operating complex systems efficiently.\(^\text{112}\)

### 2.3 – A budding Taiwanese modernization

The 2004 Taiwanese Defense White Book provides a first response to observations made by Washington on the lack of preparation of Taiwanese forces. In particular, it includes chapters dedicated to professionalization of forces, setting up a command and control system, and implementation of an organizational missile command system.\(^\text{113}\)

The missile command was created in January 2004. This unit was made responsible for coordinating air defense means of the Taiwanese army, eventually including PAC-3 missiles ordered from the United States, and the Navy’s anti-ship means (*Hsiung Feng* missiles). Although the Taiwanese Defense Ministry requires missile command to be an Inter Armed Forces unit, it still suffers from competition between the different services. This situation could reduce the efficiency of a system if it is allowed to last indefinitely, particularly if the system includes a maritime component. This unit should be capable of:

- Defining and setting up rules and doctrines for the use of antimissile defense, including aspects related to operational training.
- Collect and distribute data from all early warning and tracking sensors.
- Coordinate the engagement of exo and endo-atmospheric systems and therefore quickly trigger the use of naval means.

In short, for operational efficiency reasons, means deployed on ships should be directly integrated into Missile command, and should no longer form part of a navy-only command loop.

Creation of a single command network for all Taiwanese military operations described in the White book could contribute to strengthening the Inter Armed Forces vocation of Missile command. The selected configuration, probably influenced by contacts with American headquarters, should enable setting up a single air situation resulting from merging of data from all sensors, including whatever is supplied by the United States and that could be used directly to activate weapon systems. At the moment, the unification program of the command system is organized around modernization of the communication network\(^\text{114}\) and placement of computer tools designed to merge operational situation data for the Navy and the Air Force. These tools will probably not be integrated into the single command network until later.

Modernization of the Taiwanese command system began in 1997 and received technological support from the United States in 1999.\(^\text{115}\) It must enable the island to

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\(^{112}\) J.-P. Cabestan, « China-Taiwan: is war conceivable? », pp. 138-139.


\(^{115}\) This is the Po Sheng program, CRS Report for Congress, « Taiwan: major US arms sales since 1990 », p. 5. The United States integrates the system through an FMS operation.
make the best use of a set of capabilities dispersed between its different Armed Forces according to the various guidelines already mentioned. The infrastructure program was actually financed in 2002, and is not likely to terminate before the end of this decade.

Nevertheless, despite this technical modernization, questions could be asked about the existence of any detailed work on the production of operational concepts designed to structure a future antimissile defense system in practice. It seems unlikely that a system could be developed and could function efficiently if such an effort is not made, and this effort should a priori be carried out in coordination with American Forces. In particular, the lack of a protocol about with the United States about shared early warning could make it necessary for Taiwan to fend for itself if the national warning system is destroyed by Chinese strikes. Taiwan is particularly vulnerable to this type of action.

2.4 – Elements of study on operational efficiency

The size of the Chinese arsenal in terms of missiles and launchers makes a complete antimissile defense of the Taiwanese homeland extremely difficult, even for a few days. Taiwan should have at least 20 PAC-3 batteries\textsuperscript{116} to assure complete coverage of the homeland and to resist the first salvo composed of several tens of missiles, possibly preceded by the use of ground attack cruise missiles. With this minimum system, subsequent salvos would saturate the island's defense (taking account of reloading times) even though they would be less important. Furthermore, in the absence of any high layer defense, penetration rates estimated at between 20 and 30\% would be sufficient to assure the second Chinese artillery would reach some of its objectives.

In the best possible case, Taiwan will have neither 20 PAC-3 batteries nor a high layer defense by about 2010. Therefore it seems probable that the ballistic battle would be arithmetically significantly in favor of Chinese forces during the first days of the war. However, the existence of even a budding antimissile defense combined with weaknesses in the Chinese technical intelligence system, could limit the effects of these strikes by obliging China to oversaturate Taiwanese defenses. Nevertheless, there is no doubt that Beijing would achieve the most important part of its objective of disorganizing Taiwanese forces (even partially) in preparation for an amphibious action, if Beijing is given sufficient time.

This is actually a race against the clock for Beijing that needs to prevent Japanese-American reinforcements arriving in the region of the Strait before Chinese forces have set up an efficient bridgehead in Taiwan. The efficiency of China’s delaying strategies, particularly to prevent access by allied fleets, would be an essential factor in the success of the operation.

\textsuperscript{116}Provided that each attacking missile is engaged by at least two PAC-3 interceptors.
III -
THE AMBIGUITY OF THE SOUTH KOREAN DEVELOPMENT

The Republic of Korea (South Korea) does not at first sight appear to have created a consistent antimissile defense policy. Seoul is hesitating technically and politically, despite the fact that its neighbor possesses several tens of missiles derived from the SCUD and the deployment of American troops (37,000 men) on its territory.

However, a first contract was signed with Raytheon in October 1991 for the supply of PATRIOT systems starting from 1993 and trilateral technical discussions (Japan – United States – Korea) were started about setting up an Asian antimissile defense architecture. When this failed, Seoul started envisaging other options and turned towards Moscow\textsuperscript{117}, Tel Aviv and more recently Berlin, although American forces in Korea are starting to acquire missile defense.

However, no deployment decision has been made during this decade.

The initiation of the « Sunshine Policy » by Kim Dae Jung to reunify the two "Koreas", and the recent election of Roh Moo-hyun\textsuperscript{118} following a wave of anti-American sentiment and the improvement of political and economic relations with Pyongyang and Beijing, are not helping to accelerating the Korean decision. However, military tension between the two States remains high and it is impossible to completely eliminate the prospect of a conflict.

3 – Constraints and lines of development of a national antimissile defense system

The White Book of the Ministry of Defense of the Republic of Korea\textsuperscript{119} contains the reference statement of the North Korean threat as seen from Seoul. Pyongyang’s arsenal of tactical ballistic missiles (SCUD and Nodong) appears in this evaluation that also indicates the existence of a stock of biological and chemical weapons.

However, the White Book places greater emphasis on the conventional threat from North Korean forces on the country’s security: deployment of long range North Korean artillery at firing distance from the capital, repeated incursions into air and sea space, firing of anti-ship missiles.

\textsuperscript{117} Starting from 1993, Seoul contacts Moscow to negotiate conditions for the supply of S-300 systems that would form part of reimbursement of the Russian debt taken out in 1991. « Ballistic missile defense in North East Asia: an annotated chronology », p. 16.

\textsuperscript{118} Who initiates the « Policy of Peace and Prosperity », in continuity with the « Sunshine Policy ».

\textsuperscript{119} « Participatory government defense policy », pp. 26-28.
3.1 – South Korean political approach to antimissile defense

South Korean integration into an American antimissile defense system is no longer politically defendable in Seoul. Although the public perceives the alliance with the United States as being the basis for national security in the short term, the negotiation process initiated with North Korea which assumes both a bilateral reduction in tension and a reconciliation with China, has deeply modified the security relation between Washington and Seoul. Seen from Seoul, materialization of a North Korean military threat is no longer a concern and the assumption of a war appears to have become less probable, although it cannot be completely eliminated. Treatment of the North Korean nuclear crisis illustrates the reconciliation of South Korea’s and Beijing’s positions, to the detriment of the common approach from Washington and Tokyo.

However the South Korean Ministry of Defense must take account of the need to face the acceleration of North Korean ballistic programs in the assumption of a failure of pacific reunification.

The protection actually provided by American forces (and the security relation with the United States), the national development of offensive ballistic means, the existence of economic areas remote from the demilitarized zone and therefore more likely to be the target of the ballistic missiles (Pusan) oblige Seoul to define the role of its forces and the necessary development of its means considering the possibility of a ballistic battle.

Modernization of national air defense capabilities, that could form the embryo of a missile defense, appears to be the choice selected by South Korean authorities. The objective for the Korean Ministry of Defense is to acquire means contributing to antimissile defense without launching an official plan to acquire an architecture. This modernization is made necessary particularly due to aging of the organizational means of the Air Force, namely the Hawk and Nike systems for which the operational withdrawal has already begun and should be completed in 2010. It is consistent with an independent defense policy, satisfying the desire to rebalance its alliance with the United States while guaranteeing security with regard to Pyongyang. Furthermore, the technical choices made could enable a return to a system more tightly integrated with that deployed by the United States, for example in the context of a new government in 2008. The desire for increased independence of the Korean forces is still the subject of debates between the existing government and the

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120 Result of a negotiation with Washington.
121 To paraphrase a Korean official: « pursue missile defense without pursuing missile defense », see « Missile defense and counter-proliferation on the Korean Peninsula », p. 18.
123 « Self reliant and advanced National Defense » to use the terms in the White book (p. 36). This process of increased independence is also the result of an American-Korean negotiation started in 2002 under the name of « Future of the Alliance Policy Initiative ».
opposition, which considers this policy as being contrary to the security interests of the country\textsuperscript{125}.

3.2 – Influence of the geography of the peninsula on the architecture of an antimissile defense

The geography of the Korean peninsula is one of the factors controlling the possible architecture of an antimissile defense of South Korea.

Firstly, due to the short distance between Seoul and the Northern part\textsuperscript{126}, North Korean missiles (if fired from positions immediately to the north of the DMZ) could reach Seoul in about 2 minutes\textsuperscript{127}. In this case, their maximum altitude would be between 20 and 40 kilometers, which makes the option of exoatmospheric interceptors (THAAD or SM-3) inoperative\textsuperscript{128}. Delays in spreading the early warning to security forces and to the population also need to be minimized to enable its efficient use for activation of civil protection measures.

Considering the depth of South Korea\textsuperscript{129}, a North Korean missile fired towards Pusan would take about 9-10 minutes to reach its target with an apogee of about 100 km. Thus, the use of exoatmospheric systems could be envisaged for defense of the southern part of the country. A limited number of such systems could defend a large area and, combined with the deployment of endo-atmospheric means, improve the degree of protection obtained\textsuperscript{130}.

The topography of South Korea is an important factor. The presence of mountainous relief limits areas available for deployment of early warning and tracking (see map). Protection of Seoul is made difficult due to its geographic situation (in a basin) and its proximity to the DMZ, and above all because 25\% of the country's population lives in the capital\textsuperscript{131}. Conversely, the small size of the homeland to be defended and the proximity of the threat make it possible to envisage defense based solely on Patriot type endo-atmospheric systems\textsuperscript{132}.

3.3 – Air defense modernization program

The SAM-X program designed to replace existing air defense systems began in 2000 with the prospect of an off-the-shelf purchase. The solution to purchase 48 PAC-3

\textsuperscript{125} « Lawmakers divided over U.S. wartime control of Seoul's military », Yonhap, October 10.
\textsuperscript{126} Which is about 40 km from the demilitarized zone–DMZ.
\textsuperscript{127} The flight time might be longer if missiles are fired from positions further to the North. The choice of firing platforms depends largely on the capability of the South Korean air force to efficiently perform counter-proliferation operations (destruction of launchers).
\textsuperscript{128} This type of interceptor is used at an altitude of more than 100 km. « Report to Congress on TMD architecture options for South-Pacific region », p. 10.
\textsuperscript{129} 380 kilometers from North to South, 260 kilometers from East to West.
\textsuperscript{130} Thus, deployment of an AEGIS equipped with SM-3 interceptors would provide coverage of one third of South Korea.
\textsuperscript{131} 10 million persons.
launchers from Raytheon was selected and then put aside for financial and technical reasons\textsuperscript{133}. The current plan is to purchase 10 used PAC-2 launchers from Germany\textsuperscript{134}. The request for this sell, sent to Berlin before summer 2005, has not yet been ratified by the Bundestag.

Financing of the order of one billion dollars has apparently been voted for this modernization operation and awarded to the defense development agency to carry out this program\textsuperscript{135}. Purchase of PAC-2 launchers would cost 422 million dollars\textsuperscript{136}, which would increase the total cost to about 1.4 billion dollars (see table 2).

If the design and production cost of AEGIS type ships is included, the total budget for modernization of air defense means would be 4.3 billion dollars between 1998 and 2010, most of which is spent for this second program.

\textsuperscript{133} Such deployment would not cover all of Korean homeland, as shown in the architecture study performed by the Pentagon in 1999. Furthermore, the purchase of 40 F-15s from Boeing in 2002 for 4.2 billion dollars had an undeniable eviction effect (political and budget) on the SAM-X program.

\textsuperscript{134} « German Defense Chief, South Korea Discuss Missile Sale », \textit{AFP}, July 13 2005.


\textsuperscript{136} « German parliament impedes missile sale to South Korea », \textit{Yonhap}, February 08 2005.
## Table 2
### Financing of the Korean Anti-missile Defense Program

<table>
<thead>
<tr>
<th>FY Begins 01 April</th>
<th>RDT&amp;E (Research Development Test &amp; Evaluation)</th>
<th>Total MD</th>
<th>KDX-III Destroyer</th>
<th>SAM-X Program</th>
<th>Patriot Pac-2</th>
<th>AEGIS + Mk41 silo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>NC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$$267,500,000$$</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
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<td></td>
<td></td>
<td>$$267,500,000$$</td>
</tr>
<tr>
<td>1996</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>$$267,500,000$$</td>
</tr>
<tr>
<td>1998</td>
<td>NC</td>
<td>$$79,400,000,000$$</td>
<td>$$267,500,000$$</td>
<td>$$343,785,714$$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>NC</td>
<td>$$79,400,000,000$$</td>
<td>$$76,285,714$$</td>
<td>$$267,500,000$$</td>
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<tr>
<td>2000</td>
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<td>$$267,500,000$$</td>
<td>$$343,785,714$$</td>
<td></td>
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<tr>
<td>2001</td>
<td>NC</td>
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<td>$$76,285,714$$</td>
<td>$$267,500,000$$</td>
<td>$$343,785,714$$</td>
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</tr>
<tr>
<td>2002</td>
<td>NC</td>
<td>$$79,400,000,000$$</td>
<td>$$76,285,714$$</td>
<td>$$267,500,000$$</td>
<td>$$343,785,714$$</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>requested NC</td>
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<td>$$76,285,714$$</td>
<td>$$321,454,750,000$$</td>
<td>$$267,500,000$$</td>
<td>$$343,785,714$$</td>
</tr>
<tr>
<td>2004</td>
<td>requested NC</td>
<td>$$79,400,000,000$$</td>
<td>$$76,285,714$$</td>
<td>$$321,454,750,000$$</td>
<td>$$267,500,000$$</td>
<td>$$343,785,714$$</td>
</tr>
<tr>
<td>2005</td>
<td>requested NC</td>
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<td>$$267,500,000$$</td>
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</tr>
<tr>
<td>2006</td>
<td>requested NC</td>
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<td>$$267,500,000$$</td>
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</tr>
<tr>
<td>2007</td>
<td>calculated NC</td>
<td>$$79,400,000,000$$</td>
<td>$$76,285,714$$</td>
<td>$$321,454,750,000$$</td>
<td>$$267,500,000$$</td>
<td>$$343,785,714$$</td>
</tr>
<tr>
<td>2008</td>
<td>calculated NC</td>
<td>$$76,285,714$$</td>
<td>$$600,000,000,000$$</td>
<td>$$577,200,577$$</td>
<td>$$577,200,577$$</td>
<td>$$563,486,291$$</td>
</tr>
<tr>
<td>2009</td>
<td>calculated NC</td>
<td>$$76,285,714$$</td>
<td>$$600,000,000,000$$</td>
<td>$$577,200,577$$</td>
<td>$$577,200,577$$</td>
<td>$$563,486,291$$</td>
</tr>
<tr>
<td>2010</td>
<td>calculated NC</td>
<td>$$76,285,714$$</td>
<td>$$600,000,000,000$$</td>
<td>$$577,200,577$$</td>
<td>$$577,200,577$$</td>
<td>$$563,486,291$$</td>
</tr>
<tr>
<td>2011</td>
<td>calculated NC</td>
<td>$$76,285,714$$</td>
<td>$$600,000,000,000$$</td>
<td>$$577,200,577$$</td>
<td>$$577,200,577$$</td>
<td>$$563,486,291$$</td>
</tr>
<tr>
<td>2012</td>
<td>calculated NC</td>
<td>$$76,285,714$$</td>
<td>$$600,000,000,000$$</td>
<td>$$577,200,577$$</td>
<td>$$577,200,577$$</td>
<td>$$563,486,291$$</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>1,1 trillion</td>
<td>$991,714,285,71</td>
<td>$3,336,601,731,60</td>
<td>$4,328,316,017</td>
<td></td>
</tr>
</tbody>
</table>
3.4 – Command and early warning means

Seoul has not eliminated the possibility of acquiring national early warning in addition to those used by the United States Forces\(^ {137}\). This effort also corresponds to an ambition stated by South Korea to have its own intelligence means, as witnessed by the satellite observation program initiated at the end of the 1980s. Launching of the KOMPSAT-1 observation satellite in 1999 and launching of the KOMPSAT-2 observation satellite planned for 2005 should enable Seoul to have a multispectral observation constellation (radar, optical, infrared), for economic purposes but that could be used by the Armed Forces. A design program has also been started with the objective of launching a communication satellite. It would participate in South Korea's warning and communication network.

The future South Korean destroyers program, KDX, should enable the Navy to have three to four ships equipped with the AEGIS/SPY tracking and alert system\(^ {138}\). The program launched in 1998 should end with the delivery of a first ship in 2008 followed by two additional ships in 2010 and 2012. The KDX destroyers will also be equipped with a Mk-41 vertical launching system that would a priori be capable of being fitted with the Standard Missile-3 interceptor if chosen by Seoul. The KDX program should also enable the Navy to acquire an American communication and control system\(^ {139}\). These ships could initially be deployed in the Japan Sea to assure radar coverage of the country.

Nevertheless, at the moment the capabilities of the South Korean forces appear to be undersized considering the country's early warning needs. In the short term, early warning would be based essentially on detection and tracking radar systems of Patriot batteries. Absence of space early warning capability is bound to increase the time between firing and detection of this firing.

\(^{137}\) “Participatory government defense policy », p. 37.
\(^{138}\) http://www.globalsecurity.org/military/world/rok/kdx-3.htm
\(^{139}\) Probably the Cooperative Engagement Capability.
3.5 – **Capabilities deployed by the United States to protect their forces in Korea**

In 2003, the joint United States – Republic of Korea military committee started to transform several aspects of the deployment and missions of American forces in Korea\(^{140}\):

- Reduction in the number of Americans stationed in South Korea (from 37 500 to 25 000, to be terminated by the end of 2008);
- Relocation of American forces to the south of Seoul\(^{141}\) and modernization of their means; in this respect, Washington has decided in particular to deploy an air defense brigade composed of PAC-2 and PAC-3 batteries\(^{142}\);
- Most security missions of American forces will be transferred to the Korean army (for example protection of the demilitarized zone);
- Improved coordination between American and Korean means.

Deployment of an air and antimissile defense brigade\(^{143}\) within the new structure of American forces will only be sufficient for the protection of American installations in their new configuration. Therefore, *a priori* Seoul would not be protected, since the Korean Army would be responsible for this mission. Similarly, no deployment of additional naval means that would improve the global level of antimissile protection of Korea is planned.

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\(^{141}\) In particular, Humphreys camp located 80 km to the south of Seoul should be enlarged to contain services and means deployed at the moment around the capital (command structures).

\(^{142}\) This phase should be completed in 2008. « US to deploy new air defense missiles in South Korea this year », *AFP*, April 30 2004.

\(^{143}\) Namely 8 batteries each comprising 3 PAC-3 launchers with 16 missiles (and 5 PAC-2 launchers with 4 missiles).
However, other Korean cities and particularly Pusan, would be within the area covered by American systems.

Setting up an element at brigade level would also enable Washington to set up a local command and control structure in South Korea. This element should be integrated into the regional antimissile defense structure to enable direct reception of warning information from all sensors (on land and in space and at sea) and management of available means for engagements.

The United States has warning and tracking capabilities fitted on AEGIS ships in the 7th fleet, and also has several regional early warning radars deployed in Japan and Australia.

4 – **Antimissile defense architectures in South Korea**

4.1 – **Command structure of antimissile defenses**

Since November 7 1978, Korean and American commands have both been under the *Combined Forces Command* (CFC) for which an American general is responsible. In case of war, the CFC controlled all forces in South Korea with the mission of defending the country. An annual Headquarter exercise (*Ulchi Focus Lens*) was used to verify operational readiness of the common command\(^{144}\).

However, defense of the Capital was placed under the operational control of the Korean army as early as 1993. Management of the *Ground Component Command*, the organization responsible for this mission, was then transferred to a Korean general.

\(^{144}\) [http://www.globalsecurity.org/military/agency/dod/usfk.htm](http://www.globalsecurity.org/military/agency/dod/usfk.htm)
The current government is attempting to regain operational control of all Korean forces in the case of a war, which in particular would completely dissociate the two command structures\(^\text{145}\). It would appear that this policy satisfies the Korean President's concern for independence, and also the American wish to redeploy some means currently assigned to the defense of the Republic of Korea.

In order to perform the missions devoted to its armed forces, South Korea has started the development of a command and control system independent of the American forces command system but that is intended to be interoperable with it. This automated system would be composed of versions specific to each army. A command dedicated to ground-air defense was set up within the South Korean Air Force starting in the 1990s, and has already resulted in combining several operational functions essential for missile defense and terminating overlapping of responsibilities for planning and operations control.

In 1999, American forces in Korea had also made the decision to merge all structures concerned by antimissile defense of a theater into a single cell – *Combined and Joint Theater-missile Operations Cell (CJTMOC)* – with the two-fold objective of unifying regional elements and increasing coordination with national command\(^\text{146}\).

Separation of the CFC into two command structures would result in two distinct coexisting antimissile architectures. A reduction in the global operational efficiency appears inevitable to the extent that:

\begin{itemize}
  \item the objectives of each system are different (protection of American forces instead of protection of the population);
  \item direct access of South Korean antimissile forces to American early warning data would no longer be guaranteed, thus reducing the possibility of implementing active and passive defenses in time\(^\text{147}\);
  \item conflicts in terms of engagement policies of the two missile defense systems can occur (unprotected zones, prohibited firing on some mobiles, overlapping of responsibilities).
\end{itemize}

American forces would be much less affected than South Korean forces because the scope of their mission (self-defense only) would be less complex and would be performed by their own systems.

For South Korea, this approach would appear to be based on an assumption of a strong improbability of an attack from the North, since the weakness of its capabilities is obvious and will remain so at least until 2010. In this respect, the short term lack of a national early warning against the ballistic threat forms a serious handicap for Seoul should a conflict break out, even though the Capital appears to be the most probable target for North Korean ballistic attacks.


\(^\text{146}\) This command is located in Osan. See « Organizing for success Theater Missile Defense in Korea », *Aerospace Power Journal*, 2001.

\(^\text{147}\) Note that the United States never provides raw information originating from their sensors to Joint Staff that are not under their direct control (see Japan and Europe).
4.2 – *Lines of the operational organization of antimissile defense*

South Korean antimissile defense should contribute to several missions:

- minimize the effects of a North Korean attack on urban centers (civil populations), Seoul\(^{148}\) being the most important, and on military targets. The objective is to avoid a reduction in the operational capacity of forces or panic movements within the civilian population that would hinder South Korean and American military operations;

- integrate into a set of counter proliferation means, particularly including ballistic systems developed by Seoul;

- contribute to slowing a North Korean offensive and smooth progress of deployment of American reinforcements (and therefore protect rear areas including the port of Pusan).

For the air-breathing threat, these missions are now handled jointly by American and Korean air defense. To be effective South Korean missile defense should be built around an evolution of this doctrine.

It could be based on the following lines:

- Coordination between American and Korean missile defenses particularly in terms of the zone covered and the engagement policy (particularly if some AEGIS ships in the 7th fleet are deployed offshore from Korea). The CJTMOCS experiment could act as a starting point to build coordination tools based on existing interconnected communication networks. However, apparently no study on this subject has been engaged at this stage.

- Permanent detection of firing of North Korean ballistic missiles using Patriot batteries detection systems deployed around Seoul and on KDX-III destroyers as well as access to American early warning data.

- Fast distribution of the alert to political authorities and civil populations in the capital.

- Engagement of attacking missiles regardless of their target; firing of several interceptors for each attacking missile as soon as it is detected could be at the heart of the South Korean engagement policy (defense forces will not have enough time to determine the possible target). Yet, interception at the earliest possible moment requires very strong automation of decision loops. It requires the government to delegate early approval for firing to the armed forces. A unique detection-identification loop should be set for air-breathing and ballistic threats in order to limit possible cases of friendly fire. Finally, the stock of launchers and available interceptors needs to be consistent with the enemy arsenal (both the number and possible size of salvos). Considering the current estimate of the size of the North-Korean arsenal\(^{149}\), and knowing that the firing policy will probably be based on engagement of each enemy missile by at least

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\(^{148}\) The reference scenario for the South Korean Ministry of Defense is race by North Korean forces into the Capital, see « South Korea’s strategy of conflict », Yong Sup Han, 1997.

\(^{149}\) The lowest estimates give 200 SCUD-B and SCUD-C missiles.
two interceptors, South Korean defenses would quickly be saturated by coordinated and frequent salvos\textsuperscript{150}.

The conclusion of this fast analysis is necessarily that the only reasonable objective of the system envisaged by South Korea is to protect Seoul during the first days of a war with North Korea, thus hoping to deprive its enemy from this advantage and banking on the use of counter-force to reduce the threat.

4.3 – Study elements on the operational dimension

Even if the Republic of Korea's antimissile defense appears to be incapable of resisting Pyongyang's ballistic capacity for very long, the existence of a system does have several operational advantages.

The role of such a system could be limited to blocking the first missile salvos. The objective for South Korean forces will be to limit the effect of its strikes on the population of the capital. If there is no panic effect, North Korean missiles would no longer have any interest in military terms once the invasion has been started, due to their lack of precision. Secondary strikes designed to slow American deployment in the south of the country would \textit{a priori} be managed by USFK organizational antimissile means.

Therefore the most difficult part for the South Korean air defense is the management of the first phase of the ballistic battle, in terms of alert distribution (and its timely use to take passive protection measures) and interception. Yet, the PAC-2 systems that Seoul is planning to acquire will only have minimal antimissile capabilities and a large leakage rate\textsuperscript{151}. In short, existing missile defense capabilities would be inefficient for effectively protecting Seoul. Although the positive psychological impact of its existence on the local population cannot be ignored, this weakness could reduce the efficiency of South Korean forces, particularly because Seoul would be the first target of North-Korean ballistic missiles followed by a deluge of artillery munitions.

However, the counter-force capabilities of the United States would fairly quickly limit the size of the salvos (probably a few hours after the first firings), although their efficiency would be limited by the degree of passive protection assured in North Korea by the storage sites being underground.

\textsuperscript{150} Which assumes coordination between Korean ballistic forces, see « TMD Architecture in East Asia », p. 253.

\textsuperscript{151} For example, the administration estimated that the leakage rate after the first Gulf war was 70%. T. Postol estimated that it was closer to 90%.
The reality of the existence of ballistic arsenals, combined with severe tension situations that are potential causes of confrontations between regional powers, make North East Asia an area in which antimissile defenses have become a central problem for security of Nations.

Tokyo, Seoul and Taipei have chosen different methods of antimissile defense, since they are faced with different threats, different risks of materialization of these threats and their inherent nature. However, their decisions in the subject reflect as much their perception of the threat as their political policies towards their neighbors and towards their main ally, the United States.

Japan began an ambitious antimissile defense program in 2003, designed to provide a modern multilayer protection for the archipelago. This program is technically based on interception and early warning bricks purchased from the United States, and should enable a system to be set up by 2010. Operationally, the objective of setting up of a joint system is consistent with transformation of the Japanese self-defense force into an army capable of getting involved in regional operations. Although the explicitly considered threat is North Korea’s arsenal – for which the system is very conservatively designed – Tokyo is apparently considering the possibility that its antimissile defense would eventually provide a basis for facing Chinese missiles or possibly missiles from a reunified Korea. However, at this stage the planned system does not appear sufficient to perform such a mission.

The question of compatibility of its plan with its constitutional obligations remains an issue for Tokyo. In particular the obligation not to participate directly to the defense of the United States mainland is at odd with Japan’s constitution. Thus, the degree of integration of its system into the US Missile Defense explicitly raises questions. Yet the July 2005 decision to allow self-defense forces a certain amount of decision making freedom about the engagement of their antimissile defenses makes it technically possible to use national systems for the benefit of its American ally. At the time though, integration is to be limited to shared early warning and engagements coordination.

The South Korean government is no longer particularly concerned about a war in the Korean peninsula. The objective for Seoul is now to define the place of a reunified Korea in the region. Thus, by refusing pure and simple integration into the Missile Defense system, South Korea is creating its own space between the two large regional powers, China and Japan/United States.

Nevertheless, in order to deal with the possibility of a failure of the ongoing political process, the South Korean Ministry of Defense has initiated the development of a
first antimissile defense capacity within the framework of the modernization of its air defense. This defense system should be able to assure a satisfactory degree of protection of the capital in the early days of a conflict with the North. Seoul also made technical choices that could enable greater integration with the American system, if necessary.

While Beijing is quickly modernizing and building up its arsenal of tactical ballistic missiles with the specific objective of making massive use of them in the case of war, the Taiwanese antimissile program appears far from being able to guarantee an appropriate level of protection. Political internal rivalries about the acquisition and apparent lack of an operational structure all contribute to making it improbable that a system capable of efficiently limiting the effect of Chinese strikes could be deployed soon.

However, the weakness of Beijing's intelligence collection capabilities could lead Chinese forces to overestimate the efficiency of a system and thus work in favor of an even limited capacity. It remains to be seen whether this difficulty would really affect the rate of military operations, considering the size of the Chinese arsenal.

However, delivery of modern missile ships (AEGIS type) by the United States could maintain the balance of forces within the next decade. Only a principle decision has been made about this transfer, which remains subject to confirmation by Congress and the future administration. It is probable that Beijing will oppose it knowing full well that it is bound to reduce its coercion capacity and reinforce the operational link between Taipei and Washington. It will apply pressure on the American administration and Congress to prevent any positive decision in this direction.
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Beijing has apparently committed itself to the acquisition of a modern ground-air defense from Russia, starting from 1991. The selected system is the S-300 PMU, designed essentially for air defense missions against air-breathing targets. The Chinese Air Force probably has 6 to 8 complete battalions at the moment, each including 12 launchers equipped with 4 missiles. According to the «Military Balance 2004», China has more than 900 S-300 interceptors. Beijing has also acquired manufacturing rights of this missile under license.

Even if the S-300 PMU only has a limited capacity against ballistic missiles\(^{152}\), Beijing has apparently undertaken its modernization to acquire a genuine antimissile defense capacity. This modernization would have benefited particularly from the transfer of PATRIOT PAC-2 technologies supplied by Israel\(^{153}\). On this basis, Beijing has apparently developed the HonQi-9 with performances equivalent to the Patriot Advanced Capability-3. Some batteries of this system are apparently already deployed. A naval version of this interceptor has apparently been deployed on class 052C destroyers\(^{154}\).

For Beijing, deployment of a modern broadened air defense system (in other words extended to include the tactical ballistic threat) satisfies the fear of seeing its command centers neutralized by counter-force actions by the United States and/or Taiwan\(^{155}\). Nevertheless, protection of some agglomerations, particularly Shanghai and Beijing, is apparently also considered.

But although the essential part of the Chinese antimissile defense is now based on point protection, Beijing is apparently envisaging acquisition or development of systems capable of providing zone coverage\(^{156}\). The most credible candidate for this function would be the S-400 Triumph system near the end of its development in Russia\(^{157}\) and that apparently has performances equivalent to the American Theater High Altitude Area Defense (THAAD).

\(^{152}\) The S-300 PMU would be efficient against ballistic missiles with a range of less than 40 km. \url{http://www.rusarm.ru/p_frame/main.htm}


\(^{154}\) \url{http://www.sinodefence.com/navy/surface/052c.asp}

\(^{155}\) In particular, through deployment of batteries in the Province of Fujian facing Taiwan that accommodates a large number of Chinese tactical missile brigades. \url{http://www.inodefence.com/missile/airdefence/s300.asp}

\(^{156}\) \url{http://www.missilethreat.com/systems/hq-15_china.html}

\(^{157}\) «S-400 SAM systems to protect Moscow skies starting from 2006», Interfax, November 25, 2005.
These maps show current local situations, they are not in any way forecast maps.
**Chine vs Japon**

**Types de missiles chinois (portables)**
- DF-31 (CLRM > 3000 km)
- DF-21 et DF-21A (1000 km)
- DF-15 et DF-15A (800 et 900 km)
- DF-11 et DF-11A (500 et 600 km)
- indéterminé

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