French deterrence in the third nuclear age

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Introduction

The existence of different "nuclear ages" is above all a theoretical construct, a concept designed to facilitate a certain reading of strategic history since the invention of nuclear weapons. Nevertheless, the notion is useful for highlighting certain trends. Beyond the academic sphere, it has gradually found its way into the political and strategic discourse, particularly in the United States. The notion does not define boundaries between hermetic temporal eras in a precise or indisputable manner and is relatively Western-centric. However, it is relevant to the analysis because of its influence on the nuclear policy actually pursued by states. For example, American missile defense policy over the past twenty years has been largely shaped by a desire to address the threat posed by the development of weapons of mass destruction (WMD) and ballistic missiles by proliferating states, and not just with the aim of maintaining a form of strategic stability based on mutual vulnerability with Russia. The development of certain non-nuclear capabilities also follows this logic. Some of these political decisions are today at the root of the challenges of the third nuclear age[1].

It is generally accepted that the first nuclear age was characterized by confrontation between two superpowers (the United States and the USSR), fear of a major East-West confrontation and a bilateral arms race. A form of equilibrium and stability was based on the concept of mutually assured destruction, the ability to retaliate and the progressive adoption of arms control mechanisms[2]. Extended deterrence was also developed to contribute to strategic stability[3].

The second nuclear age is said to have begun at the end of the Cold War, following the demise of the Soviet Union and the logic of blocs[4]. Fred Iklé first described it in 1996, noting the

[1] Andrew Futter, Benjamin Zala, "Strategic non-nuclear weapons and the onset of a Third Nuclear Age", *European Journal of International Security*, 2021.

[2] See in particular Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon*, Ithaca, NY: Cornell University Press, 1989 and John H. Herz, *International Politics in the Atomic Age*, New York: Columbia University Press, 1959.

[3] Jenny Naylor, "The Third Nuclear Age", *Comparative Strategy*, vol. 38, n° 4, 2019.

[4] Gregory D. Koblentz, "Strategic Stability in the Second Nuclear Age", *Council Special Report*, n° 71,Council on Foreign Relations, November 2014; Michael Krepon, Travis Wheeler, Shane Mason (eds.), *The Lure and Pitfalls of MIRVs: From the First to the Second Nuclear Age,* Stimson Center, May 2016; Zenel Garcia, "Strategic stability in the twenty-first century: The challenge of the Second Nuclear Age and the logic of stability interdependence", *Comparative Strategy*, vol. 36, n° 4, 2017.

changes underway and the emerging challenges[5]. It was marked by the emergence of new threats linked to the risks of proliferation, nuclear multipolarity, the connection between the acquisition of nuclear weapons and other WMD, and regional crises. Against a backdrop of reduced tensions between the two major nuclear powers, it was accompanied by a reflection on the emergence of new players in the nuclear game and featured a desire to bring multilateral institutions into play to reduce the instability caused by nuclear proliferation in several regions of the globe[6].

Interestingly, theorist Colin Gray foresaw in 1999 that "*the second nuclear age can be seen as a period of interregnum between irregular cycles of peaks in the kind of great power rivalry that organizes many dimensions of strategic history*"[7]. Indeed, for several years now, theorists and observers of the international landscape have been heralding the emergence of a third nuclear age. Russia's invasion of Ukraine and the ensuing indirect confrontation with NATO seem to symbolize this change. This era is marked by a return to deterrence between great powers, in a multipolar world in which domains of confrontation overlap[8]. Three trends have been identified as characteristic of this new age: a new emphasis on the concept of deterrence, the confrontation of great powers in proxy wars and asymmetrical wars "*under the umbrella of nuclear deterrence*", and "*links between regional conflict dynamics and the strategic game of the big players*"[9].

Some believe that the third nuclear age is characterized above all by the deployment of certain non-nuclear weapons of a strategic nature, which are impacting global stability. These technological developments, most of which stem from the second nuclear age, are occurring alongside the revival of a marked hostility between great powers, reminiscent of the circumstances of the first nuclear age. The interweaving of conventional and nuclear forces, characterized by the development of dual-use weapons or ambiguity about the nature of the wea-pons, is also seen as a feature of the third nuclear age.

France's deterrence posture has not been profoundly altered by these paradigm shifts. France has chosen to continue relying on a robust nuclear deterrent since the end of the Cold War and has to some extent anticipated the renewed strategic competition between nuclear-armed states. However, these changes require us to rethink certain policies, especially as these may be linked to new technological developments. In this context, it is interesting to observe how France sees its place in the third nuclear age. This reflection comes at a time when political and capability choices are being made, and when technological turning points are being addressed. It also aims to analyze how France's strategy integrates with the analyses of its allies and partners, and in particular how it takes account of European defense issues.

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[5] Fred Charles Iklé, "The Second Coming of the Nuclear Age", *Foreign Affairs*, vol. 75, n° 1, 1996.

[6] See in particular Colin S. Gray, *The Second Nuclear Age*, Boulder, CO: Lynne Reinner, 1999; Paul Bracken, "The structure of the Second Nuclear Age", *Orbis*, vol. 47, n° 3, 2003; Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict,* Princeton, NJ: Princeton University Press, 2014.

[7] Colin S. Gray, *Ibid.*

[8] Rebecca Hersman, "Wormhole escalation in the new nuclear age", *Texas National Security Review*, Summer 2020; Nicholas L. Miller, Vipin Narang, "Is a new nuclear age upon us? Why we may look back on 2019 as the point of no return", *Foreign Affairs*, December 2019; Jenny L. Naylor, *op. cit.*

[9] Pierre Vandier, *La dissuasion au troisième âge nucléaire*, Editions du Rocher, 2018.

1. The third nuclear age: characteristics and new challenges

1.1. Renewed confrontation between great powers

1.1.1. A fundamental trend linked to the revisionism of certain major players

During the second nuclear age, tensions between the great powers faded, and the nuclear order was challenged mainly by regional and even non-state actors. As early as Vladimir Putin's second presidential term, events showed that hopes of cooperation between the great powers had undoubtedly been exaggerated. In February 2007, in a speech to the Munich Security Conference, the Russian president expressed his country's dissatisfaction with the international order built up after the Cold War, denouncing what he perceives as the unfair treatment suffered by his country and the hegemonic intentions of the West. The following year, the war in Georgia showed Russia's determination to use force to maintain some form of control over certain former Soviet republics.

With the first crisis in Ukraine in 2014-2015 (annexation of Crimea and conflict in the Donbass), it became clear that Russia's interventionism could call into question the very foundations of European security. Russia demonstrated its intention to use a policy of "aggressive sanctuarization" with a strong nuclear component to alter the borders of a sovereign European state to its own advantage. In this context, it did not hesitate to use conventional forces and nuclear rhetoric to dissuade external actors from intervening in response to its aggressive behavior in its immediate vicinity and beyond[10]. At the same time, Russia widely challenged the international normative architecture, with clear violations of both bilateral (INF Treaty) and multilateral (Chemical Weapons Convention) arms control agreements.

This growing hostility can also be observed in the Asian theater. Although there are conceptual debates as to whether China is a revisionist or revolutionary power, it is clear that it is opposed to the international order built up after the Cold War in the Indo-Pacific[11]. The main areas of tension concern Taiwan, but also the South China Sea and the land border with India. More broadly, China is explicitly seeking to reduce the United States' influence in Asia, and to establish itself as the world's leading superpower[12]. This strategic posture translates into a systematic confrontation with the West, not only in the commercial and economic sectors, but also diplomatically and militarily. In this area, the deterioration in relations is reflected in nega-tive spirals in arms procurement. The Obama administration's "pivot to Asia" demonstrated America's willingness to take greater account of China's growing military power. Since then, competition with China has taken on a key role in the security strategies of many Indo-Pacific states. It has also interfered in relations with NATO and Europe. In addition, it has entered the nuclear arena. While Chinese developments in this field had been modest since the 1960s, and consistent with a posture of minimal deterrence, rapid advances have been

[10] M. Robert del Picchia, Mme Josette Durrieu and M. Gaëtan Gorce, Rapport d'information fait au nom de la commission des affaires étrangères, de la défense et des forces armées par le groupe de travail sur "Les relations avec la Russie : comment sortir de l'impasse?", n° 21, Sénat, October 7, 2015; Isabelle Facon, "La nouvelle Stratégie de sécurité nationale de la Fédération de Russie", *Notes de la FRS*, n° 05/2016, FRS, February 10, 2016.

[11] Michael Breger, "Problems with Revisionism: A Conceptual Framework for Assessing Chinese Intentions", *FSI*, Stanford University, June 15, 2022.

[12] Hal Brands, "What Does China Want?", *Foreign Policy*, August 13, 2022.

made in recent years, suggesting that Beijing is seeking to establish itself as a leading nuclear power in the short to medium term.

Moreover, whereas during the second nuclear age certain actors were considered deviants from the international order and were referred to as "proliferating" states, the consolidation of their nuclear forces now brings them into the equation of deterrence. Thus, despite the lack of diplomatic recognition of North Korea's nuclear status, Western military staffs no longer simply regard Pyongyang as a proliferation problem but are seeking to build deterrence strategies against it. Indeed, the security problems posed by North Korea's nuclear strategy have major repercussions on the entire Indo-Pacific defense architecture. This is also true of the Indo-Pakistani dyad, whose nuclear rivalry extends beyond the Indian subcontinent.

1.1.2. The impact of the war in Ukraine

The geostrategic trends outlined above began to emerge in the 2000s. However, the perception of a post-Cold War paradigm shift has taken hold over time. In Europe, it was really the brutal invasion of Ukraine in 2022 that dashed the last hopes of establishing a cooperative system between NATO and Russia. Prior to this event, threat perceptions and diagnoses of European security differed from one state to another, and, within each state, from one political group to another. Among NATO member states, some insisted as early as 2014 on strengthening the Alliance's defense and deterrence posture in response to Russian actions, while others feared any measures that might be perceived as provocative on Moscow's side. However, the war in Ukraine has largely altered perceptions in the direction of a much more pessimistic reading of the strategic environment and a general acceptance of the analysis that NATO must strengthen its defense and deterrence capabilities.

1.1.3. Multilateral, protean competition

The war in Ukraine marks a return to confrontation between powers, even if the confrontation between Russia and NATO is indirect. Other factors characterize this emerging third nuclear age and are shaping the policies of governments, including France. Competition between the United States and China in the Indo-Pacific is not simply a question of blocs of influence. The involvement of other regional powers, such as North Korea, South Korea, Japan, India and Pakistan, makes the situation even more complex, with the emergence of strategic triangles. In particular, actions taken in response to capability developments in one country can trigger reactions in a third, initiating "arms race"-type phenomena. In the case of the India-China-Pakistan triangle, for example, efforts to deter two potential adversaries with very different profiles raise serious questions about the relevance and credibility of stated strategies. This multilateral dimension tends to make bilateral arms control agreements less relevant. What is more, unlike the American-Soviet competition marked by the pursuit of strategic parity and comparable capability developments, the third-age nuclear competition involves players with a variety of profiles, which play on their asymmetrical strengths and mobilize a wide variety of "weapons", from the military to the economic, technological and even informational fields.

1.2. Reinvestment in strategic capabilities

The notion of "nuclear rearmament" is somewhat ambiguous. The term can be used to describe efforts to acquire new nuclear capabilities (weapons, delivery systems and carriers, related systems, infrastructure) to replace obsolete ones. States undertaking these modernization efforts consider that their primary aim is to guarantee the safety and reliability of their systems. However, they can also enable the deployment of higher-performance weapons, *i.e.* those that are more lethal and/or better able to hit their target. These modernization efforts have been ongoing since the beginning of the nuclear age, with incremental improvements in weapon performance and the withdrawal from operational service of the oldest weapons. This process has continued, with multi-decade investment cycles, even during pe-riods of reduced tension at the end of the Cold War.

The current phenomenon of "nuclear rearmament" goes far beyond these modernization efforts. It is marked by the introduction of new capabilities that are likely to lead to greater dependence on nuclear forces, and by a sharp increase in a number of arsenals.

1.2.1. China: quantitative and qualitative developments

The most obvious case is China. China came through the Cold War with a doctrine of minimal deterrence. This strategy was reflected in the official adoption of a no-first-use doctrine and, in terms of capabilities, in a relatively limited force built around the notion of "massive retaliation and assured second-strike capability". Since the 1990s, China has progressively increased its arsenal while diversifying it (development of a naval component). In recent years, the change has been more abrupt. In 2021, the Pentagon told Congress that China's arsenal was likely to double by 2025[13]. More recently, these estimates have been revised upwards. In November 2022, the Pentagon declared that it was likely that China would have an arsenal of 1,500 nuclear warheads by the end of the decade, 500 more than the previous year's estimate[14]. At the same time, American researchers specializing in open-source data analysis have identified the construction of entire fields of intercontinental missile silos. According to these observations, which confirm U.S. official announcements, these fields could respectively contain 120 (Yumen site)[15] and 110 missiles (Hami site)[16]. These analyses call into question the Chinese government's willingness to stick to the official posture of minimal deterrence and a strategy of retaliation. Indeed, such large arsenals do not seem necessary to guarantee, even in the medium or long term, the vulnerability of the United States to a Chinese retaliatory strike.

[13] Military and Security Developments Involving the People's Republic of China, Annual Report to Congress, Office of the Secretary of Defense, 2021.

[14] Military and Security Developments Involving the People's Republic of China, Annual Report to Congress, U.S. Department of Defense, 2022.

[15] Jeffrey Lewis, "Chinese ICBM Silos", *Arms Control Wonk*, July 2, 2021.

[16] Hans Kristensen, Matt Korda, "China Is Building A Second Nuclear Missile Silo Field", Federation of American Scientists, July 25, 2021.

1.2.2. Russia: renewal and innovation in the nuclear sector

On the Russian side, extensive modernization programs were launched in the 2000s to replace systems inherited from the Soviet era. Most of these modernization programs did not lead to changes in strategy or strategic balances, as they coincided with the withdrawal of older weapons. This is the case, for example, with the RS-24 Yars ICBM, successor to the RT-2PM2 Topol-M, or the RSM-56 Bulava SLBM, introduced to compensate for the withdrawal of the R-39 Rif. In addition, these investments were made within the framework of the New Start treaty, with ceilings set for each category of missiles.

More recently, questions have emerged around several other Russian programs and decisions. Firstly, Russia's non-compliance with the Intermediate Nuclear Forces (INF) treaty has enabled it to develop a potentially dual-use system (capable of carrying nuclear or conventional warheads) over previously prohibited ranges (between 500 and 5,500 km)[17]. Secondly, in 2018, Vladimir Putin announced his intention to equip the country with new capabilities that are often described as "exotic" insofar as they do not replace older systems and represent new types of missiles. This is the case with the Kinzhal air-launched ballistic missile, described by Russia as hypersonic, which, although currently used as a conventional weapon (for strikes in Ukraine), could have a nuclear capability. Another weapon developed for speed and precision is the Tsirkon hypersonic cruise missile, which could also exist in a nuclear or conventional version. Two other systems have been announced and are currently under development. The first is an underwater drone known as the "Poseidon"[18]. The second, a nuclear-powered cruise missile, will probably be the last to enter operational service. This type of propulsion has been touted by Vladimir Putin as giving missiles unlimited range. Considered in the United States in the 1950s, it was abandoned due to the associated dangers (indeed, the first tests of the Burevestnik 9M730 resulted in the deaths of several Russian engineers[19]).

Finally, the Russian decision to station nuclear weapons on Belarusian territory is also a source of concern. President Aleksandr Lukashenko has repeatedly expressed his intention to host Russian non-strategic nuclear capabilities in his country[20]. In the spring of 2023, Vladimir Putin confirmed Russia's agreement to such a transfer, announced in the summer. Minsk justified this decision not only by its military alliance with Russia, but also by the desire to ensure its own security[21]. While this development does not constitute a major change or a truly exacerbated threat in terms of deterrence for NATO and France in the short term, it clearly reflects a deterioration in the security environment in Europe and, more generally, in the nuclear order built on the notion of non-proliferation and security guarantees given to non-nuclear-weapon states. The renewed attraction of acquiring nuclear weapons, in contradiction with historic agreements on extended deterrence, is also being felt in Asia. For example, the recurrent South Korean debate on the advisability of stationing U.S. nuclear

[17] Lorenz Hemicker, "Russlands merkwürdige Raketenshow", *Frankfurter Allgemeiner Zeitung*, January 24, 2021.

[18] H. I. Sutton, "Indications of Poseidon Test Launch from Submarine Belgorod", *Covert Shores*, June 25, 2023.

[19] Thomas Newdick, "It Looks like Russia's Nuclear-Powered Cruise Missile Test Program Is Back in Business", *The Warzone*, October 21, 2020.

[20] Isabelle Facon, "Le nucléaire dans la relation Bélarus-Russie", *Bulletin n° 97*, Observatoire de la Dissuasion, April 2022.

[21] Tiphaine de Champchesnel, "Vers le stationnement d'armes nucléaires en Biélorussie ?", *Brève stratégique n° 59*, IRSEM, April 21, 2023; Emmanuelle Maitre, "Des armes nucléaires au Bélarus ?", *Bulletin n° 108*, Observatoire de la Dissuasion, April 2023.

weapons on the penin-sula, or even of developing a national nuclear program, reflects a strong sense of insecurity and a lack of confidence in international regulatory mechanisms[22].

1.3. New technologies and overlapping domains of confrontation

1.3.1. The role of "new technologies"

The use of the terms "new technologies" and "emerging technologies" is ambiguous, as the new systems concerned — hypervelocity, artificial intelligence, cyber technologies — were mostly developed several decades ago. The third nuclear age is marked by the fact that they have reached maturity, are being deployed operationally and, above all, are influencing strategic balances.

Missile defense is at the forefront of these so-called new technologies. In view of current technical progress, it is difficult to believe that missile defense could eliminate mutual vulnerability to a nuclear strike. However, the investments made in this field, not only by the United States but also by China, Russia and India, mean that potential adversaries of these states increa-singly consider that their second-strike retaliation capability could be jeopardized by these systems.

Strategic non-nuclear weapons, in particular long-range precision strike systems, have differ-rent effects but can raise similar concerns. Their deployment leads some players to believe that their deterrent systems could be vulnerable to a conventional strike. This type of attacks could theoretically cripple the deterrent capability of an adversary with a small arsenal while remaining below the nuclear threshold, which could make it more attractive. Kinetic strikes, in particular those using hypersonic missiles (gliders or cruise missiles), are often considered to be potent threats in this respect. However, other non-conventional and non-kinetic capabilities could have a similar function due to the refinement and spread of cyber weapons or anti-satellite weapons, which, on a secondary level, could compromise the performance of deterrence strategies. The role of these capabilities is enhanced by a now largely digitalized environment and by the various revolutions in the field of information technology. This translates into increased detection and monitoring capabilities for systems deployed by adversaries, thanks, for example, to the proliferation of intelligence-gathering and analysis capabi-lities made possible by artificial intelligence. However, these developments are also a source of dependency, insofar as deterrent systems can be linked to complex non-nuclear communication and control architectures, which optimize their performance but also expose them to potential targeted attacks[23].

The problem of stability is magnified if we consider these technological building blocks cumulatively: some technologies could help detect and target deterrent capabilities, others enable their destruction through precise conventional strikes, and finally, defensive capabilities could safeguard against a possible retaliation involving the remaining forces. The combination of these capabilities could therefore offer an incentive for a first strike, by giving an actor confidence in its ability to annihilate the opposing nuclear force, which, since the

[22] Clint Work and Andy Hong (eds.), "The South Korean Nuclear Armament Debate", *KEI*, March 2023.

[23] Andrew Futter, Benjamin Zala, *op. cit.*

dawn of the nuclear age, has been seen as the negation of the concept of strategic stability[24]. It should be noted that even if the plausibility of such a scenario remains low, and the possibility of it being carried out successfully even lower given the reliability of current technologies, it does influence the strategic thinking of states. These systematically overestimate their adversaries' capabilities, anticipate future technological developments and adopt a worst-case scenario in their defense policies[25].

1.3.2. The impossibility of considering domains of confrontation in isolation

At the same time, the third nuclear age is characterized by the intermeshing of domains of confrontation. Confrontations might no longer take place following a known theoretical pattern, progressing from a climate of crisis to sub-conventional acts, to conventional warfare and then nuclear escalation. Adversaries may act in multiple domains simultaneously and in a non-linear manner[26]. At the strategic level, three aspects need to be carefully considered.

First of all, the cyber domain is the subject of a great deal of analysis. It has been established that nuclear forces can be the target of cyber attacks. The threat concerns the gathering of information, but also attempts to manipulate adversary systems using cyber. The aim is to make certain equipment malfunction, or to jam certain systems. Nuclear forces are generally highly isolated and protected against external cyber attacks. Nevertheless, studies and, above all, historical examples have shown that they can be affected by malicious acts. Above all, they are often connected to related capabilities that are necessary for their proper functioning, for example, detection and targeting, early warning or support from conventional forces. This more global architecture can be targeted by cyber attacks, leading to potential failures in deterrence capabilities. The multiplication of offensive actions in the cyber domain therefore complicates the strategic landscape, creating avenues for rapid conflict escalation and potentially limiting an actor's confidence in the resilience of its strategic capabilities[27].

Secondly, the space domain is also very important, particularly in two respects. Since the early days of the nuclear age, early warning systems have played an important role in the deterrent strategies of both the United States and Russia. Indeed, the certainty of being able to detect an enemy attack at an early stage, and thus have time to retaliate, is intended to reinforce strategic stability by reducing the incentives for a first strike. These systems are partly dependent on space-based detection capabilities. Space observation, intelligence and communication satellites also play vital roles in the operational implementation of deterrence.

These interactions between domains are now widely taken into account in strategic thinking linked to the emergence of a new nuclear age, particularly in France.

[24] Benjamin Hautecouverture, Emmanuelle Maitre, Bruno Tertrais, "L'avenir de la stabilité stratégique", *Recherches & Documents*, FRS, n° 05/2021, February 16, 2021.

[25] Andrew Futter, Benjamin Zala, *op. cit.*

[26] Rebecca Hersman, *op. cit.*

[27] Andrew Futter, *Hacking the Bomb: Cyber Threats and Nuclear Weapons*, Georgetown University Press, April 2018.

2. The French posture: reaffirmed and adapted

2.1. A changing strategic environment that validates French assumptions?

2.1.1. The confirmation of a pessimistic reading of the strategic environment

France's posture presents a number of paradoxes. On the one hand, at the highest political level, the desire to avoid falling into the bloc mindset or becoming locked into hostile postures towards Russia or even China is often mentioned. On the other hand, France's stated strategies and positions in multilateral fora, including NATO, are marked by a cautious, even pessimistic outlook on the evolution of the strategic situation, and a marked vigilance about the revisionist policies pursued by Russia and China. To many French officials, the war in Ukraine has confirmed the analysis that, despite the improvement in strategic relations since the end of the Cold War, it remains essential to preserve a credible deterrent force that protects the country's vital interests in all circumstances.

This analysis was already reflected in President François Hollande's speech in 2015, when he stated that the time for deterrence "*is not over*"[28]. Since then, strategic analysis has emphasized the worsening geopolitical context and suggested that nuclear deterrence retains its re-levance in relations among great powers.

Against this backdrop, the official French analysis has viewed the war in Ukraine as a confirmation of its warnings about the deteriorating strategic environment. Paris has thus been cri-tical of some of its European neighbors for having been over-optimistic when reducing their military spendings or over-confident in the advent of a norm-based international order.

Beyond the importance given to nuclear deterrence, the French reading of the strategic context is characterized by a recognition of the multiplicity of challenges that can affect national interests, both in direct head-on confrontation and more indirectly (threats to supply chains, freedom of action around overseas territories, other forms of aggression detrimental to the country)[29].

2.1.2. A gradual readjustment of strategic documents

While France has remained cautious, it has adapted its strategic thinking to the changing context. In particular, the threats perceived as the most serious have varied over the past ten years. In 2008, the White Paper on Defense expressed concern about some of the pitfalls of globalization, the uncertainties associated with the emergence of non-state actors, terrorism and the failure to resolve certain regional or local crises. It noted the need to prepare for strategic surprises and to demonstrate adaptability[30]. In 2013, a year before Russia's first violation of Ukrainian territorial integrity, France and its European neighbors were deeply

[28] Statement by François Hollande, President of the Republic, on nuclear deterrence, in Istres on February 19, 2015.

[29] Pierre Vandier, *op. cit.*

[30] The White Paper on Defense and National Security was published (Odile Jacob, 2008).

concerned about a wave of international Islamist terrorism fanned by powerful non-state groups based outside their borders. This is reflected in the White Paper adopted under the Hollande presidency, which pointed to the growing nationalism in certain regions, particularly in Asia, the proliferation of WMDs, but also the risks associated with the collapse of certain states and their inability to control their territory, fostering the rise of terrorism and trafficking of all kinds[31].

In 2017, the publication of the Strategic Review highlighted the notion of challenges to the multilateral order and to the European security architecture. While the document still places jihadist terrorism ahead of proliferation risks, it also dwells at length on what it describes as "*the reassertion of Russian power and the resurgence of war […] in Europe's eastern and northern flanks*" and the rise of Chinese power[32].

The update of the Strategic Review in 2022 was obviously influenced by the ongoing conflict in Ukraine, noting the return of strategic confrontation, a "*trio of competition, dispute and confrontation*", and conflict based on "*the return of nuclear reality, high intensity and hybridity*"[33].

2.2. Continued modernization of deterrent capabilities

2.2.1. Continuation of the modernization effort

The decision to allocate funding for the modernization of France's deterrent forces is not simply the result of recent events. It has been a long-term effort, with R&D programs designed to spread out the investments required for equipping the deterrence force. The political class had the opportunity to express its views on these choices during its review of the 2024-2030 Multiyear Defense Spending Bill (LPM).

Deterrence is the first defense mission mentioned and spelled out in the LPM for 2024-2030. The period under consideration is presented as a pivotal one, with the entry into service of the ASMPA-R, preparations for the ASN4G, work on the successor to the Rafale, and major developments concerning the new-generation submarine, paving the way for the launch of the SNLE-NG between 2030 and 2040[34].

[31] Livre Blanc Défense et Sécurité Nationale, Direction de l'information légale et administrative, Paris, 2013.

[32] Revue Stratégique de Défense et de Sécurité Nationale, 2017.

[33] Revue Nationale Stratégique, 2022.

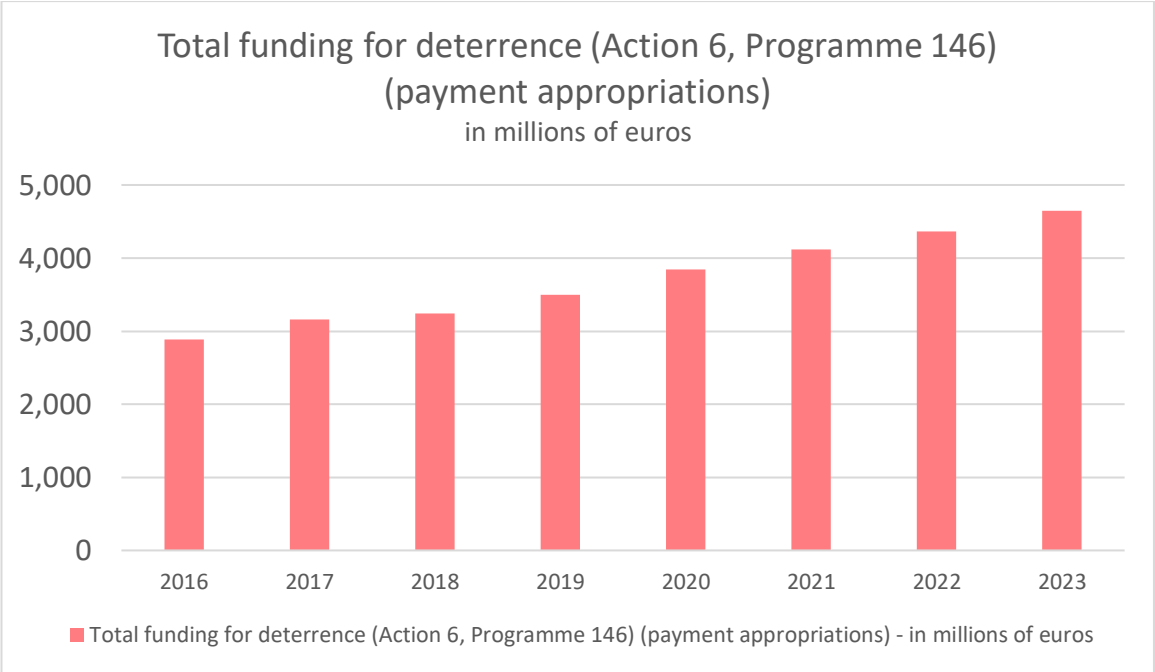
[34] LPM 2024-2030, Les grandes orientations, Ministry for the Armed Forces, April 2023.

> *"The core of our sovereignty will be consolidated. First and foremost, through nuclear deterrence, which remains at the heart of our defense, protecting France and the French people against any state-sponsored threat to its vital interests, wherever it comes from and whatever form it takes. The air, naval air and naval components of our nuclear deterrent will be modernized with a view to ensuring strict sufficiency and credibility, as well as compliance with France's obligations under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Concerning weapons, first of all, with the introduction of upgraded air-launched air-to-ground medium-range nuclear missiles (ASMP-A) and preparations for the fourth generation of air-launched missiles, as well as continued development of the M51 missile for the oceanic component (FOST). Secondly, in the area of weapon platforms, with work on the next generation of aircraft (upgrading of the Rafale and preparation of the Future air combat system (FCAS) and submarines (third-generation SSBN). The associated transmission systems will also be modernized. Nuclear deterrence remains an essential component of our national defense. Continued and sustained investment in the renewal of our nuclear deterrent will enable us to adapt our capabilities to the evolution of adversary defenses, which are becoming increasingly effective*".
>
> Law n° 2023-703 of August 1, 2023 relating to military spending for the years 2024 to 2030 and containing various provisions concerning defense.

Overall, the LPM reflects the continuation of a policy of major budget increases for the Armed forces. The budget for 2017 was €32.2 billion, versus €43.9 billion by 2024. For 2030, the figure of €67.4 billion has been proposed, representing an increase of around 24 percent compared with the first year of the new LPM. As far as the military nuclear sector is concerned, the upward trend in public funding is thus set to continue.

The budget for France's nuclear deterrent is often equated with that of Action n° 6 (deterrence) of Program 146 (armed forces equipment) of the Defense mission. This Action covers investments exclusively dedicated to the nuclear mission, with all other equipment of a dual nature allocated to other Actions. In concrete terms, the Action finances work on the M51 submarine-launched missile and the ASMP-A airborne cruise missile and its successor, the ANS4G, the Simulation program and work on the third-generation nuclear-powered ballistic missile submarine (SSBN). This budget is largely devoted to capital expenditure[35]. Although it only partially reflects the total investment required to operate France's deterrent system, it is interesting to study from a comparative perspective.

[35] Emmanuelle Maitre, "L'agrégat dissuasion : de quoi parle-t-on ?", *Bulletin n° 70*, Observatoire de la dissuasion, FRS, November 2019.



2.2.2. A watchful eye on technological developments

While the LPM insists on the primacy of nuclear deterrence, it also introduces reflections on current technological developments and their implications for French deterrence. It is interesting to note that the text of the LPM tends to distinguish between investments made to "*maintain deterrence at the highest level*" and support for innovation to build the armed forces of the future. However, an examination of the priorities stated in this area shows that the innovations supported must, according to the authorities, contribute to the credibility of deterrence in the future. This is clearly the case for priorities n° 2 (hypervelocity), n° 3 (artificial intelligence), n° 5 (electronic warfare), n° 6 (communication in all environments), n° 9 (signature reduction and stealth) and n° 10 (quantum computing for sovereign capabilities such as intelligence and deterrence). The total budget dedicated to innovation over the period 2024-2030 amounts to €10 billion.

In addition, the LPM reflects the emphasis placed on space capabilities over the past several years, materialized by the creation of a Space Command in September 2019. The LPM devotes €6 billion to this sector, with automatic repercussions for deterrence, notably in threat detection and secure communications.

Lastly, while anticipated investments in air defense systems (€5 billion over the period) go well beyond the scope of deterrence, these should play a significant role in ensuring the security of the infrastructures and systems dedicated to this mission, as they include research into upper-atmosphere interception and the development of modern detection capabilities. A similar observation applies to investments in cyber defense.

The priority given to new technologies and new areas of confrontation reflects the concerns of parliamentarians. During a series of hearings held at the French National Assembly on the sidelines of the LPM discussions, many MPs sought to gain a better understanding of the

effects of so-called "emerging" technologies on the credibility of French deterrence, with a particular focus on space[36].

While these budget documents do not reflect any fundamental changes in the role or scope of French deterrence, they do take into account the changes in the strategic and technological environment that are likely to affect it. These questions echo the reflections of France's partners in the United States and the United Kingdom on the desirability of better "integrating" nuclear deterrence.

3. A more "integrated" deterrent?

The concept of "integrated deterrence" has been used in common parlance in the United States since the Biden administration took office, but it actually stems from earlier thinking[37]. Formalized by the Pentagon in 2022 as part of the *Nuclear Posture Review*, integrated deterrence calls for "*integration across all domains, i.e. conventional, nuclear, cyber, space and informational (...) [integration] in theaters of competition and potential conflict (...) [and integration] across the spectrum of conflict, from high-intensity warfare to the gray zone*"[38]. This concept requires the integration of all national forces, and in particular better cooperation "*with [allies and] partners, who are the real asymmetric advantage the United States has over any other competitor or potential adversary*[39]*.*

On the French side, the notion raises questions because of the historic choice to keep the nuclear sector separate from other sectors[40]. Nonetheless, France is facing a number of questions similar to those being asked in Washington. For example, President Macron's speech at the École de Guerre in February 2020 showed that a debate was underway on the relationship between nuclear and conventional forces, as he stated that "*our defense strategy is a coherent whole: conventional forces and nuclear forces support each other at all times*"[41]. While we must avoid reproducing imported concepts that are not necessarily relevant to France's specific situation, we can reflect on a form of "integration" of the French nuclear deterrent.

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[36] Emmanuelle Maitre, "Réflexions parlementaires sur la dissuasion", *Bulletin n° 108*, Observatoire de la dissuasion, FRS, April 2023.

[37] Benjamin Hautecouverture, "Le temps long de la dissuasion 'multi-domaines' dans le débat américain", *Bulletin n° 104*, Observatoire de la dissuasion, FRS, December 2022.

[38] 2022 National Defense Strategy of the United States, including the Nuclear Posture Review, U.S. Department of Defense, October 2022.

[39] Jim Garamone, "Concept of Integrated Deterrence Will Be Key to National Defense Strategy, DOD Official Says", U.S. Department of Defense, December 8, 2021.

[40] Jean-Louis Lozier, "La dissuasion intégrée américaine : pertinence et limites du concept", *IFRI Briefings*, April 11, 2023.

[41] "Speech by President Emmanuel Macron on defense strategy and deterrence to trainees from the 27th class of the École de guerre", élysée.fr, February 7, 2020.

3.1. The question of the "Europeanization" of French deterrence

The first question systematically raised concerning the adaptation of France's nuclear deterrent to the challenges of the third nuclear age concerns its link with European defense. Indeed, the École de Guerre speech was particularly notable for its European dimension. Like his predecessors, Emmanuel Macron pointed out that France's vital interests are inseparable from those of its European partners. He invited EU member states to take part in a strategic dialogue with France to discuss the role of French deterrence in the European context. More specifically, he also invited European partners to participate in and observe exercises by France's strategic forces. At the Munich Security Conference in 2023, the French President "*reiterated [his] offer, made at the École de Guerre in February 2020, of a dialogue with interested European partners on French nuclear deterrence and France's conception of the European dimension of its vital interests*"[42].

Despite this political impetus, the obstacles to a greater role for French deterrence in the security of the continent were exposed – reluctance on the French side, but also reservations expressed by its partners across the Rhine[43]. It is hardly surprising, then, that the President's proposals produced few concrete results. On the French side, reservations of a political nature are being voiced which, while not hindering the government's strategy for the time being, point to potential blockages in the future. The Rassemblement national (RN), for example, introduced a bill in 2023 to amend the Constitution to state that the French President is responsible for nuclear deterrence, and that this is a purely national undertaking that cannot be shared. Firstly, this political group fears what they call the "environmentalist ideology" that could push for the country's unilateral disarmament. Secondly, these parliamentarians fear that the current government is attempting to "share" France's deterrent force with EU allies and partners. While this bill has no chance of being adopted, it expresses fears that are not heard only within the nationalist party.

Against this backdrop, the reaction to President Macron's proposals for more dialogue between Europeans on the role of French deterrence has undoubtedly failed to meet the Élysée's expectations. Modest and concrete actions are perhaps more realistic. For example, an Italian tanker aircraft recently took part in a French Strategic Air Forces (FAS) exercise entitled Poker, participating in the simulated enemy system[44].

3.2. A partnership approach with NATO and beyond

Since 2014, each event marking the deterioration in relations between Russia and NATO has been followed by reflections within the NATO framework on how best to strengthen the Alliance's deterrence and defense posture. At the Warsaw Summit in 2016, for the first time since the end of the Cold War, the official communiqué reaffirmed the Alliance's nuclear status

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[42] Visit to Germany for the 59th Munich Security Conference, élysée.fr, February 17, 2023.

[43] Lydia Wachs, Liviu Horovitz, "Les armes nucléaires de la France et l'Europe : options pour une politique de dissuasion mieux coordonnée", *Le Rubicon*, March 29, 2023.

[44] Proceedings, National Defense and Armed Forces Commission – Closed-door hearing of General Stéphane Mille, French Air and Space Force chief of staff, and Lieutenant General Jérôme Bellanger, commander of the Strategic Air Forces (FAS), on the nuclear deterrent, Compte rendu n° 36, January 25, 2023.

and its determination to maintain its credibility in this area. The need to adapt to the changing strategic environment in terms of posture, capabilities and disarmament policy was strongly reiterated. The communiqué also repeated the accepted idea that French and British nuclear capabilities complicate the adversary's calculations by increasing the number of decision-making centers. In this document, NATO noted that a nuclear strike "*would fundamentally alter the nature of a conflict*". Finally, the allies were less ambitious regarding disarmament, stating that this depended on the security situation, and that the current one was not favorable[45]. This movement to reassert the role of nuclear weapons continued until the adoption of a new Strategic Concept at the Madrid Summit in June 2022[46].

While retaining its special status within NATO (non-participation in the definition and implementation of nuclear policy), France is keeping a close eye on allied discussions on this subject. The country considers it preferable to have a form of coherence between the Alliance's nuclear policy and that of the three nuclear states within it, even if nuances are not considered problematic. France is also sensitive to the existence of a strong "*collective nuclear conscience*" among its allies and wishes to "*invest fully in all the Atlantic Alliance's initiatives aimed at reiterating its nuclear dimension and promoting the appropriation of a deterrence culture by all its members*"[47]. Finally, Paris has found it necessary to question the compatibility of certain NATO initiatives with its own conception of nuclear deterrence. Historically, for example, it has expressed reservations about the temptations of certain allies, particularly Germany, to reduce the role of deterrence by promoting the development of defensive capabilities. France has regularly stated that it would be illusory to seek to develop a missile defense system sufficiently effective to render the notion of nuclear retaliation obsolete. However, within the framework of NATO and at national level, it has recognized that missile defense could play a complementary role alongside deterrence against a limited ballistic threat. It has also supported the development of theater missile defense, to maintain its freedom of action and to counter anti-access/area denial strategies[48]. In this context, it should be noted that the disagreements observed over the German *European Sky Shield* (ESSI) proposal, which aims to promote the joint procurement of air and missile defense systems by European partners, do not necessarily reflect disagreements over the complementarity between deterrence and missile defense. French criticism focuses more specifically on the risks to European industrial sovereignty posed by off-the-shelf purchases of American and Israeli systems[49].

[45] Camille Grand, "Retour sur le Sommet de Varsovie", *Bulletin n° 34,* Observatoire de la dissuasion, FRS, Summer 2016.

[46] Bruno Tertrais, "Retour vers le futur ? L'OTAN après Madrid", *Notes de la FRS*, n° 26/2022, July 6, 2022.

[47] Proceedings, National Defense and Armed Forces Commission – Closed-door hearing of General Thierry Burkhard, chief of staff of the French armed forces, on the nuclear deterrent, Compte rendu n° 31, January 11, 2023.

[48] Défense antimissile balistique, Direction Générale des relations internationales et de la stratégie.

[49] Rapport d'information déposé en conclusion des travaux d'une mission flash constituée le 18 octobre 2022 sur la défense sol-air en France et en Europe et présenté par Mme Natalia Pouzyreff et M. Jean-Louis Thiérot, n° 866, February 15, 2023.

3.3. Towards a more global concept of deterrence?

To date, France has been relatively skeptical about the concept of "integrated deterrence", insisting on the need to avoid any form of *continuum* between conventional and nuclear weapons, and on the unique nature of nuclear weapons. It does, however, participate in NATO's discussions on these matters. At national level, there are repeated references to the traditional notion of versatility, along with that of "*greater coherence between nuclear and conventional*"[50]. The term "support" appears more systematically. During a hearing at the French National Assembly, General Burkhard explained that "*conventional forces reinforce deterrence by giving credibility to our ability to resist aggression, thus avoiding attempts to outflank from below, i.e., a small-scale threat that would quickly confront us with the 'all or nothing' choice. [...] Conversely, the ability to exert strategic pressure in the form of a dissuasive dialogue on an adversary or its potential ally gives conventional forces greater latitude to apply the full range of their know-how in a conflict: in this sense, conversely, nuclear weapons support conventional forces to avoid attempts to outflank from above. Generally speaking, this logic of mutual support reinforces the President's freedom of action in terms of the employment of conventional forces, whose capabilities must be consistent with the destructive power of nuclear weapons*"[51]. The Strategic Vision of the French defense procurement agency (DGA), published in 2023, also refers to the concept of support and integration. It notes that "*the implementation of our nuclear deterrent components has gradually evolved over time. Today, it is ensured on the one hand by systems solely dedicated to deterrence, known as the first circle, but also by shared systems and by recourse to conventional capabilities known as the second and third circles, in reinforcement*"[52]. In addition, the French Air and Space Force (FASF) specifies that "*the need to increase our agility leads us to diversify our tactics, by better integrating conventional capabilities*", but also that "*the advent of multi-domain command and combat leads us to modernize our C2 capabilities to make them more capable of integrating the opportunities offered by space and cyber*"[53].

As we can see, France's doctrine of separation between the nuclear and conventional realm does not prevent it from asking questions similar to those of its nuclear allies. These questions are not intended to encourage the use of nuclear weapons early in a conflict, but rather to ensure that France's strategic positioning takes better account of ongoing developments, especially the multiplication of domains of confrontation[54]. French strategic thinking thus recognizes the need to "*combine more closely*" conventional and nuclear capabilities, and to think of deterrence in a "global" way[55].

[50] Proceedings, Stéphane Mille, Jérôme Bellanger, *op. cit.*

[51] Proceedings, Thierry Burkhard, *op. cit.*

[52] Strategic vision of the head of the French defense procurement agency #2023, DGA, 2023.

[53] Proceedings, Stéphane Mille, Jérôme Bellanger, *op. cit.*

[54] Jean-Luc Lozier, *op. cit.*

[55] Pierre Vandier, *op. cit.*

3.4. Regulation, arms control and the global non-proliferation regime

As in previous periods, strategic stability in the third nuclear age should be promoted through the implementation of regulations and standards. But the situation has changed compared to the cold war and the post-cold war periods. Complicating factors make it difficult to adopt effective and appropriate arms control mechanisms. On a number of occasions, President Macron has stressed the importance of France playing a more active role in discussions on arms control in the future. The aim is not so much to regulate nuclear weapons with a view to disarmament, but rather to provide a mutual framework for the most destabilizing systems and those most likely to lead to nuclear escalation. The return of strong tensions in Europe, and the rearmament phenomena observed, make a continent-wide approach all the more relevant. At the same time, the nuclear non-proliferation regime remains a major factor in France's security. Indeed, despite the difficulties encountered, such as the North Korean and Iranian crises, non-proliferation standards still exist in most parts of the world. It is therefore essential that we continue to invest in keeping this regime alive, and encourage the international community as a whole to react strongly to the failings of certain states.

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Anticipating the advent of a new nuclear age, with all the problems it poses, is not enough to resolve the major challenges. For France, as for the other nuclear-armed states in NATO, the main challenge is to continue to invest in a broad spectrum of capabilities while limiting crowding-out effects. In view of the military development of certain states, particularly in Asia, it is essential to reject the arms race mindset, and avoid trying to copy all of the adversary's military developments. Weapons procurement must be motivated by a genuine strategic need. It is also crucial to encourage partnerships and develop joint procurement strategies. Finally, in a context where a majority of countries are contesting the possession of nuclear weapons by a handful of states, it remains essential to take these criticisms into account by promoting arms control, risk reduction and non-proliferation efforts.