THE MARITIME MILITARY INSTRUMENT AT THE MULTI-SPECTRAL CHALLENGE OF STRATEGIC COMPETITION

ANALYTICAL REFLECTIONS IN LIGHT OF MARE APERTO 24

By Emmanuele Panero

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Introduction

May 27 marked the conclusion in the Central Mediterranean of Exercise *Mare Aperto 24*, the main annual multi-domain training activity planned and conducted by the Italian *Marina Militare*, and in particular by the *Comando in Capo della Squadra Navale*, in coordination with assets belonging to the fleets of partner and allied Countries. The edition, which lasted for nearly four weeks, was, for the first time, integrated with the French *Marine Nationale*'s Exercise *Polaris*, which focused on the readiness of air-sea forces to the re-emergence of high- intensity conventional conflict, involving the Carrier Strike Group (CSG) of the aircraft carrier *Charles De Gaulle*.

The strengthening of mutual knowledge and interoperability both in the conception, organization, and management of exercise activities, as well as in the planning and conduct of maneuvers and tactical tasks, between *Marina Militare* and *Marine Nationale* was further fostered by the mutual inclusion of units from the two fleets in the opposing parties envisaged by the exercise, as well as liaison personnel embarked on the respective naval units. All in all, nearly 10,000 military personnel and 100 manned and unmanned assets from 22 States, including 11 Atlantic Alliance Member States, took part in the activities in an articulated, complex and evolving scenario, intended to test the competence and readiness of the forces along the entire spectrum of air-sea operations from cooperation to competition to conventional warfare, generating synergistic effects in the physical, virtual and cognitive dimensions, while systematizing lines of action at the strategic, operational and tactical levels.

In the context of the exercise, the Center for International Studies (CeSI – *Centro Studi Internazionali*), as usual and in the context of the historical partnership between the Institute and *Marina Militare*, deployed on the aircraft carrier *Cavour*, flagship of the Italian fleet, a nucleus of personnel to contribute to the development and management of the scenario, reconciling realism and the pursuit of the training goals. Starting from the direct experience on board, in the different phases of the exercise, combined with the always valuable comparison with Sailors, Petty Officers and Officers of both *Marina Militare* and *Marine Nationale*, and integrated with the in-depth observation of the evolutionary dynamics inherent to the maritime domain in the current international strategic context, the present analysis aims to outline the doctrinal, organizational, operational and capability requirements of the near future for the maritime military instrument.

A multi-mission fleet for a multi-spectral strategic continuum

The concept of Three Block War, developed in the late 1990s by General Charles Krulak of the United States Marine Corps (USMC), poignantly described the challenges, cognitive even before military, imposed by a contemporary battlefield where in the space of three blocks, in the same built-up area, a USMC unit would potentially find itself in parallel conducting high-intensity combat in one, managing peacekeeping activities in another, and providing humanitarian assistance in the third. Originally conceived for a land-based, primarily urban, operational environment characterized by the presence of civilians and an asymmetric adversary, the definition, minus the name, fully delineates the plurality of missions that, in today's strategic environment, can be assigned to an airborne device in rapid succession, sometimes concomitantly.

Indeed, the expansion of the continuum-of-competition, from international cooperation to high-intensity conventional warfare, in increasingly fragmented and rapidly changing operational contexts, requires the maritime military instrument to significantly consolidate its character as a flexible, adaptable, projectable, and persistent national power structure, anywhere and anytime. Promoting the Country in naval diplomacy activities, preventing security crises, managing humanitarian emergencies, protecting freedom of navigation, deterring malicious actors or defending the national interest are just some of the missions that a single unit can accomplish in the course of a naval campaign, involving constant understanding of the operational environment, redefinition of intent, adjustment of posture and adaptation of rules of engagement. The ability of maritime assets both to reach virtually any geographic area autonomously and to remain there for extended periods remains the essential added value of any fleet, emphasized by the diverse array of resources, sensors and effectors that enable individual units to play the role of advanced logistical and health stations and to survey a broad three-dimensional bubble above, on and below the surface, intervening against potential threats if necessary.

Although all of this in itself does not represent a recent innovation in the potential expressible by navies, the transformation of the international scenario has revealed their central role in contemporary times, with the sharpening of strategic competition at the global, regional and local levels, the manifestation of supply chain vulnerabilities, with particular reference to maritime bottlenecks, as well as with the proliferation of crises and conflicts. The geographic expansion of the theaters of eventual deployment and the frequent simultaneous compression, or even segmentation, of the escalation curve make aeronaval devices the primary instruments of military power, always ready for deployment and capable of performing a plurality of missions,

as well as complex tactical tasks, adapted to each oscillation along the cooperative- competitive, peaceful-belligerent, asymmetric-symmetric, hybrid-conventional spectrum that characterizes today's operational contexts.

Composite, resilient and high operational readiness fleets therefore appear essential to promote, preserve, protect, and defend national interests and international security. This implies not only a constant process of technological upgrading and operational integration of assets and capabilities, but above all a relentless human, professional and technical enhancement of military personnel. Recruitment and retention represent precisely a preeminent existential challenge for all navies, postulating the opportunity for new communication strategies and human resource management, adapted to social transformations and oriented to attract multi-sectoral skills, promoting the essential contribution of the naval military instrument, and those who are part of it, to the advancement of the Country.

The multi-domain nature of maritime operations

A naval asset in itself represents a composite aggregate of multi-domain capabilities, from airspace surveillance, to surface ship control, to underwater monitoring, via the profound impact of onboard equipment and sensors in the electromagnetic environment, the massive cyber surface of hardware and software saturating all embarked systems, as well as the inevitable impact in the information environment caused by the simple movement of units that by definition represent a Country's overseas projection. However, an airborne device is not a conglomerate of individual isolated points, but rather a network of closely connected nodes, capable of generating combined and coordinated effects through the synergistic integration of related specialized capabilities. With this in mind, command, control, and communications (C3) functions are critical and are often dependent on satellite links provided by a space-based architecture capable of reaching any deployment area, allowing data and information to be exchanged with sufficient bandwidth. The extra atmospheric segment is also crucial for supplementing and expanding situational awareness of assets at sea, identifying potential threats and supporting intelligence, surveillance and reconnaissance (ISR) capabilities deployable by individual units.

Precisely the ISR function proves decisive in contemporary articulated and changing operational contexts and even more so with the spread of the concept, promoted by the US Navy, of Distributed Maritime Operations (DMO), which is based primarily on the development of an interconnected network of increasingly robotic and autonomous surface and submarine airborne

sensors. Indeed, understanding the area of responsibility is a fundamental prerequisite for the planning and conduct of any activity, but to be achieved it needs a significant mass of assets capable of monitoring large areas with optical and multispectral systems, persisting for long periods of time and recording even the slightest variations over time. This appears even more significant with the progressive advent of tactics, techniques, and procedures (TTPs), as well as technological solutions devoted in parallel to improving unit concealment and generating "ghost fleets" with the use of increasingly advanced electronic decoys. The availability of unmanned aerial vehicles (UAVs) capable of being catapult- launched and then landing vertically is in this vein a transformation already underway, especially in the US context, while the inclusion of UAVs, including large and possibly armed ones, aboard aircraft carriers, as in the case of General Atomics' Mojave drone trial on the Royal Navy's Queen Elizabeth class, is a coming reality for naval aviation. Looking forward, UAVs could both supplant some of the roles played by embarked aircraft groups and significantly expand the surveillance range and ISR capabilities of any ship equipped with a helicopter deck, without causing significant remodeling and reconfiguration of cargo and space on them.

Finally, the ability to generate effects in the land domain as well is again a central aspect, not only in terms of amphibious capability, but also in terms of long-range kinetic effectors. If Combined Amphibious Task Forces (CATFs) are the essence of the shore projectability of maritime power, functional to establish a solid beachhead in contested areas and enable the safe deployment of land units, the ability to fire artillery or missile against high-value targets (HVTs) deep into the adversary's territory has proven to be increasingly relevant to disarticulate its offensive potential, as most recently demonstrated by the US-led Operation Prosperity Guardian in the Red Sea.

The aeronaval maneuver and the expansion of the intervention arm

An element that has always characterized air-sea warfighting is, by the very nature of the maritime domain, the substantial absence of defined fronts and total fluidity between offensive and defensive maneuvers. This has been further emphasized by the exponential increase over the last three decades in the engagement distances secured not only by the consolidation of the capabilities of fixed-wing assets and the associated payloads of naval aviation, but also by a combination of the increased range of sensor technology and that of the intervening arm of integrated effectors on naval platforms. If the RGM-84 Harpoon, developed by the then McDonnell Douglas and first entered service in 1977, in fact has a range of about 70 nautical miles, the Naval Strike Missile, developed by Kongsberg Defence & Aerospace and operational since 2012, reaches 130 nautical miles, without taking into account the range provided by the increasing deployment of anti-ship cruise missiles (ASCMs), such as the nearly 300 nautical miles of the Scalp Naval, developed by MBDA. Similarly, although to a lesser extent, submarine effectors have also seen improved performance, with the MU-90 Impact entering service in 2008 capable of covering up to 12 nautical miles, compared to 6 for the Mark 46, introduced between 1963 and 1979.

Increased engagement distances have enabled individual units to generate effects over a significantly greater area, while at the same time making them more vulnerable to attacks from all directions, especially with the advent of the same improvements in coastal anti-ship missile batteries. The transition of maritime combat, above and below the surface, to a confrontation diffusely beyond line-of-sight (BLOS) also risks causing an undue marginalization of naval maneuver, the relevance of which has re-emerged not only in operational contexts characterized by compartmentalized spaces, as in the case of the Bab el-Mandeb Strait, but especially with the advent of threats capable of approaching covertly at high speed, such as unmanned surface vessels (USVs). Not differently, the hybridization of naval confrontation, as has been underway for years in the South China Sea, whether by the conduct of non- professional approaches by military assets or the deployment of civilian and para-military vessels, mandates the careful preservation of maritime savoir-faire to manage each phase of the dispute-conflict continuum at sea.

The growing capabilities expressible by fixed- and rotary-wing naval aviation assets, together with the expansion of the potential tasks assigned to them, then emphasizes the need to constantly train synergistic coordination below and on the surface, as well as in the third

dimension. Indeed, the existence of this inherent tripartition, with its attendant profound differences, risks generating not only a fragmentation of situational awareness but also a segmentation of air-sea maneuver. Instead, the three-dimensional dilemma constantly imposed on the adversary over varying distances dictated by the constant integration of fire and movement continues to be the center of gravity for dominance over conflicting seas.

The logistical support at sea

The ability to sustain an air-sea device deployed in an area of interest over time by resupplying and rearming it remains the foundation for the projectability and persistence of the maritime military instrument. Although this is constantly being trained in almost every major exercise and practiced in the context of peacetime deployments of units, three relatively recent trends have underscored the desirability of strengthening not only the resupply fleet but also the operations that can be conducted by it.

First, the proliferation of crises and conflicts, with an ever-increasing rate of deployment of assets to geographically distant locations, often for months at a time, has significantly increased the need for more refuelers, including those of different sizes, capable of ensuring better adherence logistics to devices of varying sizes and with varying requirements depending on the mission. At the same time, the implementation of the DMO concept has thus forced a coherent revision of maritime logistics support, emphasizing the requirements for scaling up the dedicated fleet and adjusting deployment doctrine to ensure a mobile logistics articulation to supply ships with profoundly different sizes, capabilities, and supply needs over significantly larger areas. Ultimately, the crisis in the Red Sea has manifested how in a theater marked by high operational tempo and consumption rates, not unlike what might occur in a high-intensity conventional warfighting scenario, the entire ship platform, including effectors, need to be safely replenished offshore. In detail, the conduct of activities under Operations Prosperity Guardian and Aspides, have shown, for all navies, a significant shortfall in the high-sea rearming capability of vertical launching systems (VLS) for missiles, with critical issues in terms of effectiveness and permanence in the area of responsibility. In order to meet the latter requirement, the US Navy itself has committed between 2023 and 2024 nearly 16 million dollars to the development of a modular system dubbed Transportable Re-Arming Mechanism (TRAM), while the *Marine Nationale* conducted, precisely during the period of Exercise *Mare Aperto 24 - Polaris 24*, the first at-sea rearmament of *Aster* air defense missiles, carried out by

the *Durand*-class (BRF - *Bâtiments Ravitailleurs de Forces*) refueler *Jacques Chevallier*, for the benefit of the aircraft carrier *Charles de Gaulle*.

While logistical autonomy is one of the fundamental characteristics of naval assets, the increase in the number and distance of deployment areas, combined with increasingly challenging operational requirements, calls for a review of the fleet, capabilities, and concept of naval supply deployment.

The proliferation of the air threat and the Intercept Economy Dilemma

The conflict in Ukraine, the escalation in the Middle East and the crisis in the Red Sea have highlighted how the air threat has become increasingly relevant and diverse. Drones of all sizes, shapes, and flight profiles, anti-ship missiles, as well as ballistic and cruise missiles now pervade the battlefield, being deployed and employed, even with relative effectiveness, not only by peer competitors anymore, but with increasing ease by asymmetric adversaries with overall limited technical-technological expertise. The accessibility of these attack systems has also been fostered by a consistent simplification of them and a significant reduction in their relative prices for acquisition and use. In addition, different aerial threats have been increasingly integrated for the conduct of saturating and complex attacks specifically conceived to overwhelm the identification, control, and engagement capabilities of modern air defense systems.

The emergence of the new form of threat has highlighted, on the one hand, precisely a criticality in terms of the cost of interception relative to the value in itself of the drone or missile employed by the adversary and, on the other hand, the quantitative limits of air defense arsenals both embarked on individual naval units and in stock in the depots of the various navies. Thus, the lessons identified noted how the development of new anti-drone systems, including recurrent electronic or directed-energy countermeasures, is essential to the economic sustainability of prolonged air threat defense operations. Similarly, the desirability of equipping naval ships with a significantly higher number of vertical launch cells, or increasing the number of missiles per cell, with the use of interceptors of special sizes and characteristics, have emerged as cross-cutting requirements.

In detail, an upgrade of integrated combat systems appears to be a fundamental premise, with the threefold purpose of increasing the range of detection apparatus, enabling the simultaneous handling of different types of targets, and strengthening the capability, both on the platform

itself and through synergy with other multi-domain systems, to track the growing threat posed by anti-ship ballistic missiles (ASBMs). In addition, the development, acquisition, and embarkation of sufficient volumes of anti-ballistic missile (ABM) interceptors is particularly relevant for increasing the survivability of a fleet by distributing anti-ballistic capabilities over multiple ships and providing sufficient mass of interceptors to oppose possible saturating attacks. In conclusion, enhancing anti-air and anti-missile capabilities, postulates the simultaneous integration of complementary and scalable systems for the effective and cost- efficient neutralization of the full spectrum of potential threats, also in order to disarticulate the saturating effect attempted by complex attacks.

In addition to the prospects offered by a combination of electronic warfare apparatus and directed energy systems, at present, antiaircraft artillery, especially when armed with timed fragmentation ammunitions, as in the case of the widely deployed Oto Melara 76/62 *Super Rapido*, appears to be the most effective and efficient solution in countering low-end threats, while allowing engagement at distances greater than that of other systems employed for the purpose but originally designated primarily for close defense.

The transformation of the surface naval battle

Increasing the action arm of naval sensors and effectors represents only one part, and in some ways the least recent part, in the transformational trajectory of anti-surface warfare (ASuW). Mass and dispersion, on the contrary, represent the two principles that have been established over the past few years with the intent of balancing operational survivability of one's own air-sea device and the attrition of the adversary's. Although the concept of DMO originates in the specific theater of the Indo-Pacific, its premises originate from the general observation that conventional warfighting in the maritime domain is characterized by a pervasive and widespread lethality, generated by the multi-domain proliferation of long-range antiship missiles, such that it requires a rethinking in the composition and employment of fleets.

Although the evolution of naval combat in the contemporary era does not marginalize large platforms, which remain the mainstay of any air-sea device in terms of capability and force projection, the same tends to favor smaller, and less costly, assets with highly reduced crews and/or advanced autonomous capabilities. USVs, in addition to posing a transformative and changing threat, as evidenced by the ongoing testing and refinement of naval exploding drones employed with great success by the Ukrainian Armed Forces in the Black Sea to contest and

interdict maritime dominance by the Russian fleet, can, in fact, perform a plurality of tasks at increasing complexity by hosting suites of sensors and effectors. The greater willingness under challenging operational conditions to accept a higher attrition rate for unmanned systems, and thus to deploy them more boldly in contact with the adversary, is one of the advantages dictated by the inclusion in the near future of an increasing number of classes of USVs for tasks primarily in ISR and as missile launch platforms.

This latest development, combined with the US Navy's willingness to decommission its Ticonderoga-class fleet, poses a potential conundrum about the future of cruisers, heirs to doctrinal primacy in surface-to-surface combat from battleships and now increasingly rare in the world's fleets. In contrast, many of their capabilities are being cross integrated into a hybrid series of naval platforms that are increasingly hybrid in tonnage and capability, from the People's Liberation Army Navy's (PLAN) Type 055 Renhai class to *Deutsche Marine*'s F126 Saarland, that is sign of a redefinition of categories and priorities even in large naval vessels.

If naval drones represent the near future of naval battle, countering their use as surface stealth kinetic effectors, perhaps by asymmetric adversaries, also necessitates the evaluation of new technical requirements for combat systems, in order to enable the detection of targets approaching above water, encourage a review in passive defense apparatuses, including with reference to the armor levels of ships, and implement active defense apparatuses adapted to the new threat, not excluding with a reevaluation of anti-ship guns and machine guns.

The reemergence of the submarine and anti-submarine warfare

The submarine (almost) domain represents one of the most hotly contested frontiers of strategic competition, not only in operational terms but also in terms of technological advancement. With this in mind, investment in submarine fleets has increased significantly, and many navies are engaged in the development and acquisition of an underwater device composed of manned and unmanned underwater vehicles (UUVs), combining reduced tracking, high-performance sonar, hydrophonic and optical sensing, and often manipulation and intervention capabilities at great depths. Not unlike above the surface, undersea warfare is also geared toward a DMO concept, further emphasized by the substantial removal in the design of UUVs of all obstacles dictated by the physical safety underwater caused by the presence of human operators. At the same time, underwater data and information communication and transmission capabilities remain the most critical issue, especially from the perspective of synergistic maneuvering of a

multiplatform underwater device. The submarine remains in the maritime domain the preferred asset for the conduct of covert ISR activities, particularly at long range and with prolonged stay in waters under adversary control, as well as for the infiltration and exfiltration of specialized components in the vicinity of critical infrastructures, port and offshore, or along the coast.

The renewed relevance of submarine fleets, combined with a noticeable increase in their employment by some Countries, has in parallel re-emerged the importance of anti-submarine warfare (ASW). The recovery of these capabilities, however, has involved an upswing not only in the development of sonar technologies, but also in the operational skills and especially the professional expertise of military personnel in the field. The ASW segment, in particular, has proven to be among those most closely tied to the availability, or acquisition, of dedicated naval platforms designed for the task from the design stage to maximize stealth and detection potential. With this in mind, the ASW version of the European Multi-Purpose Frigates (FREMM), as corroborated by the US Navy's decision to reprise its design for its Constellation-class FFG(X) currently under construction, is a successful example. If the seabed, with its critical resources and infrastructure, represents across the entire globe a strategic (almost) domain for each Country's development and resilience, then the competition to guard, protect and contest it requires appropriate capabilities and assets, above and below the surface.

Conclusions

The joint conduct of Exercises *Mare Aperto 24* and *Polaris 24* summarizes, along the evolution of its training scenario and the interaction of the different components of *Marina Militare* and *Marine Nationale*, many of the doctrinal, organizational, operational, and capability challenges posed by the contemporary strategic environment to the maritime military instrument. The re-emergence of multilevel competition among States, the hybridization of security dynamics, the proliferation of threat vectors, and the potential return of high-intensity conventional warfighting to the maritime domain as well, combining past and new trends, in fact impose a transformation of fleets. This analysis aimed to point out some of the directions of this, noting how many of the adaptations will take years to come to fruition, being determined by the constant dialectical interplay between offensive and defensive capabilities, technological developments and doctrinal adaptations. If continued prosperity will also depend in the future on Sea Lines of Communication (SLOC), as it has for more than four centuries, then the ability to protect them and project security will continue to fall to navies and the Sailors, Petty Officers and Officers who animate their assets.

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CeSI - Center for International Studies is an **independent think tank** founded in 2004 by Andrea Margelletti, who has been its President ever since.

The activity of the Institute has always focused on the analysis of internationalrelations and the dynamics of security and defense, with particular attention devoted to areas of crisis and the dynamics of radicalization and extremism, afterwards expanding its analytical tools also in the field of geoeconomics and conflict prevention.

The flagship of CeSI is certainly its **analytical methodology** which is based on an in-depth knowledge of the analised context, on a daily and transversal information research and on a periodic visit in the areas of interest, which allowsthe analysts of the Institute to carry out timely and dynamic work. Furthermore, the Institute has created a wide network of collaborations and partnerships with other think tanks, universities, institutional and non-institutional stakeholders in the reference countries.

The goal is to provide tools which will contribute to help to better understand thereality and provide useful elements for decision making. What the CeSI intends to provide is a multifaceted approach which, in the complexity of the contemporary world, is based on an understanding at 360° of the dynamics in action by the actor.

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In five years, attended as a civilian at the Army School of Applied Military Studies in Turin, he graduated summa cum laude, earning a BA in Strategic and Security Sciences and a MA in Strategic Sciences, from the Interdepartmental University School in Strategic Sciences (SUISS) of the University of Turin.Subsequently, he earned a II Level MA in International Strategic-Military Studies with honors, attending the 25th Joint Services Staff Course, at the Centre for Higher Defence Studies in Rome
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