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Operational Considerations in Developing Command and Control Doctrine for
Future Surface Navy Land Attack Weapons

by

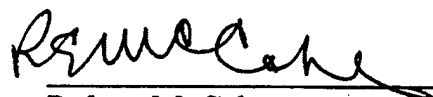
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Abstract

The Navy continues to pursue advanced weapons systems to project force ashore from the maritime environment since the success of Tomahawk cruise missiles. In what may be referred to as the Land Attack era for the Surface Navy, increasing emphasis is placed on the tactical responsiveness of future Land Attack weapons systems. While from a systems standpoint this may be acceptable, doctrine must be prepared that also compliments the inevitable operational use of these tactically responsive weapons. Without proper consideration of details that connect both levels of maritime power projection, tactical exploitation of future Land Attack weapons stands to undermine operational flexibility.

There is a command and control architecture in place that has due regard for today's emphasis on innovative changes which, through years of evolution, also has an appreciation for relationships between operational and tactical command and control. The Navy has the opportunity now to reap the benefits of that evolution without stalling innovation. The command and control doctrine inherent to Tomahawk strike coordination is a firm basis on which to build doctrine for future Land Attack operational success as well as tactical responsiveness.

Preface

In the course of developing my ideas I found the issue of airspace control for future Land Attack weapons voluminous for a work of this size. It remains unaddressed here not because of its magnitude or due to a lack consequences but rather because it is largely a foreseen challenge. In conversations with program offices, NAVSEA, NWDC, and CNO N8 staff it is clear to me the issue is recognized. My sense is that Land Attack weapons will be fitted into conventional means of dividing and/or scheduling airspace albeit with new tools or decision aids. Airspace control is not underestimated but it is anticipated. In this work I shed light on unanticipated issues so that Land Attack command and control doctrine does not defeat itself at the operational level.

INTRODUCTION

The United States Surface Navy is still in the developmental stage of introducing new Land Attack weapons to the Fleet. When fully developed, these weapons will demonstrate great responsiveness, accuracy, and precision. Moreover, they will be equally applicable at the operational and tactical level largely by virtue of the increased scope of targets within their extended ranges. However, range is but one attribute of these weapons that tie their tactical level developmental initiatives to operational level implications. There are additional ties. These important ties will be explained to give them due consideration and thereby facilitate a discussion of proper command and control doctrine for future Land Attack weapon systems. A developing command and control doctrine must recognize and embrace the relationship tactical level application has to operational level planning and flexibility.

Tomahawk Strike Coordination has architecture in place that recognizes these relationships and therefore should serve as a basis for developing near term command and control doctrine for future Land Attack weapons. This proposal is supported by an appreciation of Surface Land Attack background, discussing current influences on future systems, followed by a brief description of those future systems. Additionally, an understanding of the roles of Surface Land Attack Warfare, how it supports the bigger operational picture, and recognition of challenges that affect continued operational support are offered. Finally, valid criticism to the proposal will be considered along with flexible solutions.

BACKGROUND

The military services struggle to meet the challenge of seeking and adapting to new roles. Our Surface Navy was no exception in its efforts to transcend blue water influences

into increasingly less familiar missions. The cold war investment in the Tomahawk Land Attack weapon system may prove to be the most fortuitous in terms of the Surface Navy's continued growth and utility. For example, in the face of the massive post cold war reductions, the capability of a platform to conduct Tomahawk Land Attack was a major consideration for deciding which ships to decommission. Clearly the age of a ship was also a factor, however, some relatively young Spruance class destroyers were decommissioned largely due to their lack of Land Attack capability. The deciding factor was usually high capacity vertical launch Land Attack. This capability provided the Surface Navy with a greater role and utility in the littoral theaters of joint warfare. Thus, for the Surface Navy the post cold war era has taken shape as the Land Attack era.

The other military services also invest more heavily to develop weapons systems aimed at competing in the role of precision standoff capability and achieving rapid tactical results. As a result, today's Surface Navy adjusts in order to remain competitive and more flexible in Land Attack Warfare (LAW). Thus, "Building on a legendary and historically strong Maritime Dominance foundations, the Surface Combatant Navy is developing and perfecting weapons, sensors, and tactics to project offensive force, master Land Attack Warfare, and dominate the littoral Battle Space."¹

INFLUENCES TO LAND ATTACK REFINEMENT

Currently, there are two primary trends in Land Attack that will be discussed as both evolutionary and revolutionary. First consider the evolutionary. The Tomahawk weapons system has roots in the nuclear strategic level of weapons employment during the late cold war. Therefore, it was relatively slow and bureaucratic in the command and control of all variants including the conventional warhead. In order to effect change in a competitive

environment, a system in place and well suited for strategic and operational level tasking was streamlined for quicker, more tactically suitable tasking. This transition evolved through modifications to existing systems such as the *Advanced Tomahawk Weapon System*, which offers more responsiveness and flexibility at the unit tactical level. Additionally, procedural command and control changes at the operational strike coordinator level streamlined the linkage of target identification to planning and execution of fires. This gave rise to a cascade of tactical innovations such as “Rapid fire plan and shoot” doctrine.² Debates continue today over how suitable Tomahawk in current or future forms will ever be to tactical level usage. More important is that the effort represents increasing momentum in thinking toward the tactical applications of Land Attack weapons. Given the roots of Tomahawk doctrine, the aforementioned changes can occur with little or no cost to operational flexibility regardless of success at the tactical level.

Second, with regard to the more revolutionary: the Surface Navy has taken advantage of technology and invested substantially to refine responsiveness, accuracy, and precision in Land Attack capability. These capabilities are developing largely from the ground up with little emphasis on modifying existing systems and procedures. New revolutionary weapons concepts are constantly improving target area coverage and will continue to evolve as did Tomahawk. However, these new revolutionary systems are not evolving under the same historical strategic and operational level influences but are developing with great rapidity and emphasis on increased tactical range and utility. For example, the Extended Range Guided Munition (ERGM) is not yet in the fleet although it is giving rise to the development of the

² “Rapid fire plan and shoot” was a command and control technique designed to shorten the kill-chain or time factor between intelligence events, planning a specific Tomahawk mission, and execution. This was designed to make the weapon more tactically flexible against relocate-able (though not mobile) targets. Despite its intent, it has been attempted against very mobile, although momentarily stationary, targets.

Advanced Gun System (AGS), which will improve the range. The Land Attack Standard Missile (LASM) is expected to evolve into the Advanced Land Attack Missile (ALAM) with greater range. The Existing Tomahawk Land Attack Missile (TLAM) is already capable of extensive ranges and serves as the predecessor to the Tactical Tomahawk (TACTOM), which, as suggested by its name, promotes more tactical flexibility. The trend of thought towards tactical design is somewhat ironic in that increased range tends to make weapons more operationally relevant by virtue of greater target area coverage. For simplicity in accomplishing the purpose of this paper, an examination of the extended range guide munition (ERGM), the Land Attack standard missile (LASM), and to a lesser extent the tactical tomahawk (TACTOM) will be used to facilitate a discussion of proper Surface ship Land Attack command and control doctrine.

ERGM AND LASM SURFACE FIRE CONCEPT: THE “system of systems”

In this Land Attack era, the Navy defined its vision for the future in *From the Sea, and Forward...From the Sea*. Similarly, the Marine Corps stated their vision in *Operational Maneuver from the Sea* and *Ship-to-Objective Maneuver*. Both branches of the Naval service sought to leverage the advantages of technological achievements and master information management, battlefield mobility, lethality of weapons, and precision engagement. As a result, the Surface Navy will be able to coordinate with greater tempo and intensity and provide support to land operations much further inland. The ability to do so will be achieved through exploiting digital data technology that integrates the communications between man and systems as well as among systems alone.³ What is the “system of systems” supporting this vision? The conceptual design features three components: target acquisition systems, the

weapon systems, and command and control systems.⁴ The following is a deliberately brief explanation of these systems.

Target acquisition systems encompass assets that detect targets for preplanning. They also use data streams from forward deployed ground combat units in need of supporting fires. Systems envisioned for probable use in operational targeting include the Joint Attack Radar System (JSTARS), Airborne Reconnaissance Low-Multifunction (ARL-M), and Unmanned Aerial Vehicles (UAVs). Those systems usually associated with tactical applications include laser and radar designators and range finders capable of integration into digital communication nets. The main influence of this digital integration is an envisioned tactical responsiveness in fire support achieved through command and control automation of sensor data in conjunction with weapons delivery platforms.⁵

The weapons systems will be found on both current and future Cruiser and Destroyers. Since the load-out configuration for each platform can be tailored, each platform will probably share space among all precision-guided munitions as well as “dumb” munitions. The initial load out scheme typically provides the best flexibility for the Naval Surface component and places a premium on maneuverability and multi-tasking availability in support of joint operations.

Conceptually, command and control for the future Land Attack “system of systems” is the most “Net centric” aspect discussed thus far. The command and control concepts envisioned are highly automated and closely linked to sensor technologies including those described above. Time delays in the kill chain are minimized through advanced levels of technology between forward units, their sensors, and the launch platforms.^{6 7} Although the

⁶ The ground soldier and his equipment are included in the context of “sensor”.

targeting capability for these systems includes strike as well as fire support, the command and control concepts emphasize responsiveness to fire support agencies. These incorporate agencies such as the Supporting Arms Coordinator (SACC), the Force Fires Coordination Centers (FFCC), Fire Support Coordination Centers (FSCC), and Fire Support Elements (FSE). Accordingly, command and control agencies, both afloat and ashore, will be able to gather, process, communicate, prioritize, plan, and coordinate the use of shipboard weapons.

One of the best conceptual examples for future Land Attack system tactical responsiveness is the planned interface with the Advanced Field Artillery Tactical Data System (AFATDS). The AFATDS is a multi-service automated fire support command and control system, consisting of numerous dispersed multi-functional nodes connected by tactical radio communications systems. It automates the functions performed by support agencies, which include processing fires requests from sensors and prioritizing engagements based factors such as response time, weapons availability, target characteristics, Joint Munitions Effectiveness Manual guidelines, and guidance from relevant unit commanders. "AFATDS will select and generate an engage/fire order to the optimum weapon system available to engage a target ... AFATDS prioritizes fire support requests and determines the most appropriate weapon system response ... significantly increases the efficiency of the fire support available to the maneuver forces."⁸

ROLES OF SURFACE LAW

Naval Fire Support and Surface Strike

Naval Fires Support is best described as direct or indirect support to ground unit(s) that must coordinate Naval gun, missile, and electronic warfare fires with other fires such as Combat Air Support. Naval Surface Fires Support is the focus of the Land Attack system's

development. This may have been influenced by the momentum of Tomahawk's evolution toward the use of long-range precision capable weapons in more tactical roles. Regardless, the SACC, FFCC, FSCC of the Marine Corps as well as the FSCOORD, FSE of the Army will be well served by this tactically responsive system. Greater depth, weapons massing capability, weapons selectivity, and reduction of the kill chain are worthwhile returns for the technology investment.

Of course in the broader scheme Naval Surface Fire Support is integral to operational success necessary for achieving national and military objectives. To these ends Surface combatants also participate in the Naval Surface Strike role. Naval Surface Strike is generally a more scheduled and less urgent means of neutralizing enemy targets ashore more often at the operational level as well as tactical level.

These missions are performed in order to diminish an enemy's will to behave contrary to our national interests as well as diminish his ability to conduct operations directly against U.S./Allied / Coalition forces. They require relevant Land Attack command and control equipment and doctrine to be both tactically responsive and integrated with an operational strike fires. Furthermore, since they often would be employed simultaneously, Naval Surface Fire Support and Naval Surface Strike must not interfere with each other.

The use of systems whose design emphasizes tactical responsiveness in support of operational engagements is not necessarily a problem. In fact, the Navy's Surface Strike role is likely to benefit even though such benefit may be a derivative of advances in rapid fire support and greater selectivity of ordnance. A system designed to meet the urgent needs of the end user, for example the Marine in contact with the enemy, can be scaled down to meet less urgent requirements when planners are inserted into the automated loop. Therefore,

from a systems standpoint, a design heavily influenced by responsive Naval Surface Fires Support may be compatible with operational strikes. The degree to which both roles are compatible is a matter of doctrine.

THE BIGGER PICTURE

The Joint Force Commander's role in LAW command and control

“The JFC is responsible for the successful application of the operational art of war in his theater.”⁹ The Joint Force Commander (JFC) must possess either a vision of the entire operation or a developing vision of certain portions of the operation as it unfolds. Based on the vision, the JFC's mission is to create certain effects upon the enemy. These effects must occur at certain times, in specific places and on certain portions of the enemy based on the overall scheme. “Integral to the concept of operations is the concept of fires; for a JFC this typically equates to joint fires. This concept describes how tactical, operational, and strategic fires will be integrated and synchronized.”¹⁰

The when, where, and how of executing operational fires is not always apparent prior to initiating action against an enemy since an operational plan often cannot completely map out the timing and therefore the use of fires assets. Even an operation that meticulously anticipates and plans for the use of fires assets can be forced to change the execution of its plan mid course. This, of course, can be mitigated to some extent with branch planning. Thus, the JFC may only be able to plan on identifying certain critical enemy actions which trigger own force staged actions such as fires. The timing of the actions may however be less controllable. In general, an operational plan is dynamic and subject to changes in timing, space, and force including changes to operational fires. After all, as Clausewitz suggested, war is interactive.

In light of this, the JFC must also manage the depletion of quantities of munitions through weapons apportionment and target prioritization. Synchronizing fire is not just a matter of avoiding fratricide; it must also use synergy so that limited resources have the maximum effect. The utility of this is apparent from an operational vice tactical perspective where establishing conditions for decisive action is part of the formula. However, in the operational context, apportionment is only one element among the dynamics to achieve proper weapons usage. "The JFC may also make available specific assets for joint operations area (JOA)-wide employment, such as a certain number of Army Tactical Missile Systems (ATACMS), wind corrected munitions dispenser fused weapons, or Tomahawk missiles."¹¹ The "make available" in the preceding quotation should not be misinterpreted as merely a static apportionment issue. Apportionment itself is very dynamic. For example, the Commander Army Forces acting as a JFLCC and executing the JFC vision can not be concerned with merely the number of available ATACMS at any one time or even simply their usage rates. The locations and mobility of the ATACMS are also part of the apportionment dynamics with which he is concerned.¹²

The degree to which these new revolutionary weapons will provide the JFC with impressive capabilities and flexibility will depend on the efficiency of their employment. In developing appropriate command and control doctrine for Land Attack weapons important operational considerations may be overlooked if the doctrine is developed under a systems engineering atmosphere which overly stresses responsiveness and automation. There are operational vulnerabilities to a tactically oriented command and control. The next section will explore the dynamics and vulnerabilities that apply to future Surface Land Attack.

NAVAL LAND ATTACK FIRES

Challenges

The command and control doctrine for Navy Fires has yet to be detailed in the program directive for the Naval Warfare Publication of Navy Fires. Prior to developing a command and control doctrine one must first consider the challenges presented by both system and non-system characteristics. Accordingly, the following addresses characteristics of warships and the LAW program in terms of apportionment, maneuverability, automation of firepower, and weapons availability as well as the timing and interrelationship of some of these characteristics. This portion of the discussion safely assumes the Navy will conduct Land Attack outside of its own area of operations and therefore will interact with the Joint Fires Element.

Apportionment alone does not resolve potential conflicts between tactical usage and operational flexibility with regard to weapons availability. In the case of Navy Land Attack, multiple weapons types will be magazined on individual ships. For the sake of this discussion, exclude Navy ships carrying these weapons as hull types since it is only important that the source of the weapons will be an afloat platform. Each platform, therefore, will initially enter a theater as a bundle or configuration of Land Attack weapons and can support multi-tasking solely within the field of Land Attack. Additionally, each type of Land Attack weapon may demonstrate varying degrees of suitability to operational, and tactical applications as operations develop.

To further appreciate the fluidity of apportionment dynamics, one must also keep in mind that a ship's configuration will change as weapons are expended. Therefore, it is

critical to control the changing Land Attack configuration of ships within this evolving operational picture. This, in turn, has critical effects on operational maneuverability.

Warships in general and especially those to be outfitted for Land Attack provide significant operational maneuverability because of their multi-tasking capacity within the contexts of both LAW employment alone as well as missions other than Land Attack. “Flexibility is one of the fundamental qualities of U.S. Naval forces. Naval forces are traditionally capable of adapting to a variety of situations, often task organizing for the mission at hand. Land Attack doctrine should do nothing to reduce this inherent flexibility. It should be as flexible as possible ...”¹³

Flexibility is essential. The issue of an absence of warship LAW configuration control at the operational level must first be resolved. Otherwise there exists the potential to inadvertently stiffen the flexibility to change the operational scheme of maneuver or the use of operational fires. This is particularly true if only tactical considerations are driving expenditures. This must be an issue of platform LAW configuration control vice weapons allocation control since the availability of allocated weapons types must remain credible to the component commander.

In short, per platform, a certain changing quantity of TACTOMs will be tied to a certain changing quantity of LASMs, which in turn will be tied to a certain changing quantity of ERGMs regardless of the initial allocation. Expenditure, controlled or uncontrolled, affectively morphs a warship’s offensive form and therefore its operational applicability. Thus, maneuverability / task-ability and apportionment are interrelated. The “worth” of maneuverability is tied to weapons platform configuration dynamics.

Timing Issues

There are obvious and profound advantages to sensing targets and quickly launching appropriate weapons deep into an overland theater inside an enemy's detection and decision cycle. However, many of the automated functions, particularly those associated with network centric warfare, are not scheduled to be implemented until well after the weapons are on line circa 2010.¹⁴ The weapons, on the other hand, beginning with TACTOM, are due to be phased in around 2003-04. This timeline already takes into account normal setbacks in weapon system development. It is imperative that LAW doctrine be developed soon and that it avoid initial dependency on excessive automation and network centrality.

Additionally, there is currently no credible reason to believe that network centric technology will produce affordable systems with automation algorithms capable of operational awareness. Technology will not "appreciate" the developing operational circumstances. Therefore, technology cannot consider those developing circumstances in order to influence weapons mix and platform flexibility. The foreseeable technology that expends weapons and affects LAW ship configurations will not understand its impacts to operational art particularly where maneuver is concerned.

Finally, the timing of weapons availability alone is an important issue. "Although three of the new Land Attack systems have initial operational capability (IOC) dates of 2003, the whole fleet will not have the new capabilities at that time. The new systems will trickle into the fleet over a period of several years."¹⁵ Not every Destroyer or Cruiser will be LAW capable beyond the current block III Tomahawk. Modifications to the Vertical Launch systems and weapons control systems as well as installations of ERGM compatible gun systems are programmed only for a subset of the total Cruiser and Destroyer force. Since all

levels of fires will be initially staked on fewer Land Attack weapons, operational commanders are not likely to be concerned with having too many assets. More importantly, with initially fewer rounds, each round fired will have greater configuration affects.

DOCTRINE TO AVOID

Having identified some problems, the next step in identifying a proper point of origin for developing command and control doctrine is to identify certain pitfalls. First, any central command and control authority will be challenged to understand and effect proper Land Attack warship configurations in light of dynamic weapons usage and the dynamic JFC operations. Hence, there will likely be incentives to circumvent configuration management difficulties through re-distribution. However, this is unacceptable since Land Attack weapons allocations must maintain some degree of credibility. Therefore, the power to manage warship LAW configuration must remain separate from the power to affect the quantities of weapons allocated to various component commanders. Likewise, tactical level commanders should not be saddled with dynamic operational considerations while expending weapons types. The FSCoord, FSCs, FSEs should not be distracted with concerns regarding the warship configuration control or its affects on maneuver as they relate to the broader scope of the operation or campaign.

It is true that fire agencies such as the SACC, or FFCC do manage fires with greater involvement with the operational level. However, this is generally only within the context of Naval amphibious operations and may not extend outside of the Naval amphibious operating area. There are clearly situations in which the whole operation is amphibious. This is a departure from our assumption that the Navy will conduct Land Attack outside of its own area of operations but it is a valid departure and means that the doctrine must be flexible

enough to allow Amphibious fire support agencies to fully control weapons usage under the right circumstances. This, as well as achieving the right degree of automation, is a matter of scale-ability in the system and the doctrine.

LAND ATTACK DOCTRINE POINT OF ORIGIN

The proper doctrine should pursue some degree of ship LAW configuration control using an established organization that has experience in and appreciation for configuration issues in an unfolding operational picture. Therefore, Land Attack command and control doctrine should be based on the Tomahawk Strike Coordinator (TSC) architecture already in existence mainly within the Navy's numbered Fleet staffs. First, TSC architecture is already expected to continue in support of TACTOM. Second, there are pragmatic reasons to build on this architecture for Surface LAW in general. Third, the rationale for this solution is more convincing in light of the anticipated delay between weapons types entering fleet use and the associated network centric concepts coming into reality years later.

The advantages of using existing TSC architecture for Land Attack command and control doctrine are detailed below. Currently, TSC duties are performed by a team consisting of a Navy Lieutenant Commander, a Lieutenant, a Chief Petty Officer, and one senior enlisted working within the current operations department. The existing organizational structure would expand in order to support future additions to Land Attack since the personnel are fully employed in training and employment of Tomahawk alone. One solution is to designate a separate commander under J3 and lateral to the Maritime ops department to head the Land Attack function. The details of manning the TSC structure, while important, are less important than keeping management of all weapons under one qualified team so that warship LAW configurations are controlled in terms of the entire

bundle of Land Attack weapons vice just one variant. This is because each Land Attack weapon has a broad range of operational and tactical utility that overlaps with the others.

The TSC is trained and experienced in the dynamics of changing missile load-out configurations in both quantity and variant. Moreover, in joint operations the TSC does not decide upon the distribution of Tomahawk assets and has limited input into requests for reallocation. On the other hand, the TSC does decide how to best task firing units and provide operational CINC and JFACC directed fires. When tasking firing units, the TSC's decision is heavily weighted by how the upcoming fires will affect Tomahawk platform configuration in view of follow-on operational planning and potentially even strategic employment. For example, in a joint operation the TSC is highly unlikely to plan Tomahawk expenditures without anticipating at least the next one or two developing Air Tasking Orders being formulated or an awareness of warship multi-tasking efforts under development. Additionally, airspace control issues are routinely coordinated with JFACC. The TSC is ideally positioned to make these decisions since that officer is in routine touch with the Fleet commander or the JFC (who might be the same) and his staff as well as the JFACC.

In addition, the TSC's own staff possesses experience with operational organizations such as the Joint Targeting Coordination Board and with the formulation and refining of the Joint Integrated Prioritized Target List. Furthermore, although co-location is ideal, the TSC has the connectivity ashore or aboard the numbered fleet command and control ship to be in tune with fire support agencies at both operational and tactical levels. In fact, the TSC watch station offers tremendous theater awareness. Thus, the TSC watch station is not just in a position that permits greater coordination with the JFACC, but also enjoys the C4I capacity

to coordinate with organizations such as the Battlefield Coordination Detachment, the Joint Special Operations Task Force, and tactical fire support agencies.

The points detailed above are the principal ones that demonstrate why some variation of the current TSC architecture is an ideal LAW fire support coordination center and serves as the point of origin for developing flexible command and control doctrine. The nomenclature of the coordinator of Land Attack weapons has already been coined as the Naval Surface Fires Coordinator (NSFC) although the doctrine itself has not been developed. For the remainder of this paper, NSFC will be referred to in the sense that it is based on the TSC architecture.

Valid Criticism

The most obvious and worthy criticism against incorporating a central Surface LAW manager is based on the concern that responsiveness will be negatively affected by adding a control node. There are ways to incorporate flexibility and reduce or eliminate this concern specifically as it applies to the well being of the end user ashore such as the Marine in need of urgent tactical fires. This will be offered in following paragraphs. However, proper consideration must also be given to the well being of the operation as a priority. Both perspectives have a stake in the protection of forces. With regard to the effectiveness of the operation, there is a cost-benefit consideration in the analysis of tactical responsiveness that affects the overall equation of *net* gains or *net* losses to the operation. Concern over the protection of forces must be of paramount importance. However, allowing this concern to overly influence doctrine to the extent that tactics potentially drive the operation can be damaging in many ways. Indeed they can increase lethality to friendly forces in light of a failed or extended operation.

Flexible Solutions

Based on the foregoing, the scalability is the key to adjusting command and control such that balance is struck between responsiveness and survival at the tactical level and ultimate success at the operational level. The following are three examples of increasingly decentralized command and control with emphasis on tactical flexibility as afforded by operational circumstances. They are still influenced by the TSC architecture as the point of origin for NSFC command and control doctrine.

1. Maximum NSFC control. This includes controlling both weapons type and platform source for an ordered effect. Maximum platform configuration control is achieved in view of maximum operational flexibility. For example, less expensive LASMs could more easily be husbanded as substitutes for TACTOM. Component commanders and fire support agencies only order an effect vice a weapon. This is the most challenging to tactical responsiveness.
2. Medium NSFC control. NSFC governs only the weapons platform source for an ordered weapon type. This offers medium configuration control while increasing tactical flexibility and responsiveness. For example, while tactical commanders get the desired weapons type, the sources for them are managed such that warship configuration suits developing operational fires and maneuver planning.
3. Full control delegated below NSFC (SACC, FSCoord, FSC, FSE, SHIP CONTROL). Under the right circumstances, such as limited conflicts with only a single component area of operations, this affords the shortest kill-chain, the greatest tactical responsiveness and flexibility.

CONCLUSION

In recent years there has been a building momentum toward tactical Land Attack applications of Tomahawk in an effort to make a cold war era operational / strategic weapon continue to thrive in today's Land Attack era. At the same time the Navy advances in development of new Land Attack systems that are applicable at all levels of war. The command and control doctrine for these weapons must embrace the links that tactical usage has to operational implications. There is a threat that the momentum of tactical thought will overrun the development of doctrine for newer systems that have limited or no roots in operational doctrine. In other words, the timing is such that the momentum of the evolutionary stands to potentially overrun the doctrinal development of the revolutionary.

To prevent this, certain ties that link tactical usage to operational flexibility must be made apparent. The true dynamics of apportionment, weapons usage, warship LAW configuration management, and their affect on operational maneuverability of multi-tasked platforms are among the leading factors that give tactical doctrine operational implications. In formulating the proper command and control doctrine for the future Land Attack weapons, the Navy has the opportunity to leverage all the benefits of existing architecture with foundations in operational and strategic level perspective while continuing to achieve greater responsiveness. Innovation does not have to start completely anew to be revolutionary. At the very least, the proposed architecture will serve as a bridge to a point when weapons availability, technology, and the maturity of network centricity can assume greater automation and give due regard to the operational perspective.

Notes

¹ Director, Surface Warfare, Memo for Distribution, Ser N864/OU653919 of 11 Sep 00, 1.

² Explanatory footnote on page 3.

³ Naval Surface Fire Support Program Office, PMS 429. Concept of Employment for Naval Surface Fire Support (Near-Term Capability) (Washington, D.C., 31 October 1997), 3.

⁴ Ibid., 5.

⁵ Ibid., 7.

⁶ Explanatory footnote on page 5.

⁷ Director, Surface Warfare, Memo, 8.

⁸ Concept of Emploment for Naval Surface Fire Support (Near-Term Capability), 8.

⁹ Corps Deep Operations, Tactics, Techniques and Procedures Handbook, 1990, 2-3.

¹⁰ Joint Chiefs of Staff, Doctrine for Joint Fire Support, Joint Pub 3-09. (Washington, D.C: May 1998), I-2.

¹¹ Ibid., I-3.

¹² Corps Deep Operations, 2-5.

¹³ Center for Naval Analysis, Land Attack Doctrine C3: Constraints, Contexts and Choices, CRM D0000468.A2/Final (Alexandria, VA: 2000), 10.

¹⁴ Ibid., 7.

¹⁵ Ibid.

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