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The Next EFV: Aligning Marine Corps Capabilities with National Security

CDR In H. Ha

9 May 2011

The Expeditionary Fighting Vehicle program is seemingly dead and rightfully so.¹ For more than twenty years, the \$15 billion EFV acquisition program has been plagued by delays and rising costs and could consume up to 90% of the Marines' ground equipment budget for several years.² On 6 January, 2011, the Commandant of the Marine Corps responded to the SECDEF's decision to terminate the EFV:

In the complex security environment we face, the execution of amphibious operations requires the use of the sea as maneuver space. A modern amphibious tracked vehicle is the means towards this end....The Marine Corps remains committed to develop and field an effective, survivable and affordable amphibious tracked vehicle.³

General Amos espouses sound military strategy - maneuver warfare on land and sea domains to efficiently defeat the enemy. Yet, the commitment to an amphibious tracked vehicle will again risk misalignment of what is desired with what is realistically affordable for the complex operating environment. Furthermore, the fundamental design concept of a fast and affordable amphibious tracked fighting vehicle is currently an insurmountable technological hurdle.

However, an *amphibious* fighting vehicle is not the only means to this end. A hovercraft embarked with a land Fighting Vehicle can deliver power projection ashore for the current and future threat environments. The fast hovercraft is the perfect delivery vehicle for amphibious operations and has an extensive water range in the hundreds of miles. More importantly, it can deliver a fighting vehicle ashore specifically tailored for land combat and therefore engineering sacrifices are not made in protection, armament, or range.

Ultimately, an amphibious force structure should align with national security goals; specifically addressing the hybrid threat and supporting partner capacity-building.

Otherwise, precious resources are squandered in an already bleak and still uncertain fiscal environment. This paper will argue that the proven hovercraft, if retrofitted with modern weaponry, is the amphibious capability needed to support Navy-Marine Corps missions across the spectrum of conflict, and better address national security strategy.

GENESIS OF EFV CAPABILITIES

In order to answer the question, “what kind of amphibious capability do we really need to deal with the most likely scenarios” as posed by Secretary Gates in May 2010, it would be beneficial to understand the purpose of a tracked amphibious vehicle such as the EFV.⁴

The advantages of a tracked amphibious vehicle harken back to WWII when the Marine Corps reinvented itself into a specialized amphibious assault force that, *by necessity*, would conduct frontal assaults on small islands in executing the framework of War Plan Orange against Imperial Japan.⁵ Critical to War Plan Orange was the capture of a chain of Central Pacific islands and atolls to be used as advance bases to support fleet operations advancing to Japan as prophesized by Major Ellis as early as 1919.⁶ Later in 1921, the contested frontal amphibious assault was endorsed by Marine Corps Commandant Lejeune and adopted as the *raison d’être* of the Marine Corps as the organization faced possible extinction between the two World Wars.⁷

The invasion of Tarawa atoll in November 1943 was the first American offensive action in the Central Pacific region executing War Plan Orange and the first time Landing

Vehicle Tracked (LVT) were used in a combat landing.⁸ Commonplace among Pacific islands is a coral reef, extending hundreds of yards concentrically out to the sea, which the standard landing craft could not negotiate. Troops carried in tracked LVTs crawled over the coral reef with relative few casualties, many of those carried in standard landing craft had to disembark several hundred yards from the shoreline and wade in under fire and suffered egregiously.⁹

In comparison, today's operational Amphibious Assault Vehicle (AAV), introduced in the 1970's, is basically an updated version of a WWII tracked amphibious vehicle that can transit 7kts thru water and generally debark 2 miles from shore.¹⁰ However, with today's advanced technology, the seaward approaches could present high Anti-Access, Area-Denial (A2/AD) threats consisting of mines, submarines, and long range anti-ship cruise missiles (ASCM) which mandate an Over-the-Horizon (OTH) approach to amphibious operations. Such A2/AD technology is cheap, easy to use, and readily available as evidenced by Hezbollah's 2006 ASCM attack against an Israeli warship: one missile hit the INS *Hanit* 10 miles from shore while the second missile struck an Egyptian ship 36 miles from shore.¹¹

This OTH approach came to be known as Operational Maneuver from the Sea (OMFTS) as envisioned by General Charles Krulak in the 1980's.¹² In short, OMFTS is a concept for the projection of naval power ashore which would enable multiple seaborne landing points on an extended front, facilitating maneuver warfare and deep penetrations to decisively defeat the enemy. In blitzkrieg-like fashion, air and ground forces would advance to inland objectives. Critical in obtaining overwhelming tempo and momentum is to immediately proceed from the beachhead to inland and not be restrained to the logistical "iron mountain" delivered at the lodgment. The iron mountain of logistics is envisioned to

stay afloat OTH on seabases, thus avoiding operational pause at the shoreline and enable seamless projection from sea to land.¹³ An amphibious assault debarked 25 miles from shore was deemed adequately safe from the ASCM threat circa 1980's. Therefore the EFV was designed to be launched 25 miles from shore, essentially a one hour transit at the intended 20kt.¹⁴

However, the technological bugaboo is that propelling a 34 ton rectangular, high drag armored vehicle at 25kt through water is simply not feasible within cost limits. Perhaps in 10-15 years, more power dense fuel-efficient engines and lighter materials can be affordably developed to overcome limitations such as "hull speed." Hull speed is related to drag and traditional water displacement hulls cannot exceed hull speed without exerting enormous amounts of power which then becomes a Marine Engineering death spiral - more power means more fuel to carry which requires more power. Hull speed in knots is equal to 1.34 times the square-root of the length of the waterline in feet. For example, the AAV at 26ft has a hull speed of 7kt. Modern boats partially overcome hull speed with streamlined hulls, catamarans and semi-displacement hulls or planing which reduces the wetted surface area and therefore drag. The EFV uses a deployable bow ramp in order to plane or surf over the water and requires a powerplant 1.5 times an M-1 Abrams battle tank!

NEEDED CAPABILITY FOR NEW REALITIES

Today, negotiating coral reefs is still a concern as well as mines, shoreline defenses, submarines, and ASCMs. Under Secretary of the Navy, Robert Work, envisions a future "littoral maneuver" onto hostile shores as a joint theatre entry, a "deliberative undertaking with weeks of pre-landing shaping operations" where only after having successfully

identified, isolated, and sanitized access areas would littoral maneuver begin.¹⁵ Mr. Work deliberately uses the terminology of “littoral maneuver” to conceptually shift away from terms such as “forcible entry” and “amphibious assault” which are arguably tied to cognitive conceptions of storming a contested shoreline a la Tarawa and *Saving Private Ryan*.¹⁶

In such a scenario, fixed and concentrated defenses near the exposed shoreline would be to the enemy’s detriment when faced with overwhelming naval and air power. As demonstrated in War Plan Orange execution, the Japanese learned the futility of defending near the shoreline after the Marianas campaign in June 1944. At Peleliu, September 1944, and onward, the Japanese adopted a defense in depth, where main defenses were shifted inland into fortified caves and tunnels in a stubborn defense to the last man.¹⁷

However, this is only one scenario in the littoral maneuver concept of future theater entries - a set piece attrition battle without regard to time restraints and one that seemingly discounts effectual enemy counteractions during the weeks of pre-landing shaping operations. A set piece battle negates the temporal advantages inherent with maneuver from the sea - operational dilemmas are diminished because the enemy is afforded time to readjust. Shaping operations over weeks unrealistically assumes that there will be no external time restraints for theatre entry (i.e. political). Ironically, this scenario resembles the island campaign of War Plan Orange where the U.S. had dominant sea and air control to prevent reinforcement of the surrounded Japanese island garrisons, not a theatre entry. Additionally, a lengthy deliberate approach does not capitalize on the vast capability advantages the U.S. military has in logistics, carrier aviation, and long range strike that can be better leveraged in a more rapid littoral maneuver to the enemy’s detriment.

Mr. Work's scenario is achievable, but policy making is more effective if the military arm is effective across the spectrum of conflict. Corollarily, more military capability infers a broader range of policy options in an uncertain future environment. To further policy options, go back to the principle of OMTFS – use the sea as a medium to dictate the time and place of landing to advantage and then maneuver to the objective since the enemy cannot defend in depth everywhere. For example, in General MacArthur's lesser known campaign on New Guinea, he utilized landing craft frequently to circumvent Japanese strongpoints and land in undefended regions. Using land-based aviation and amphibious flexibility, he was able to "leapfrog" to great effect with very few shaping operations because he was dictating the time and place of landing.¹⁸

Although ASCMs may force the landing force debarkation point further out to sea, if the landing force can rapidly close the beachhead from afar, then the enemy's dilemma of where to defend is exacerbated. Maintaining the element of surprise implies high waterborne speed. Conceptually, the efficacy of a littoral maneuver's operational dilemma imposed onto the enemy is directly proportional to the range and waterspeed capabilities of the landing forces. The determination of the debarkation point remains a fine balance between maintaining surprise, supporting operations ashore, and minimizing enemy's A2/AD threat.

CAPABILITY DESIRED

Therefore, the desired capability is to rapidly deliver mobile land units 80-160nm at sea in order to out-maneuver the enemy once ashore. Although no two tactical situations are identical, the range band is regulated by the ability of naval aviation to support the landing forces both at sea and deep within the land mass. Capabilities inferred are stealth, range,

resilience to submarine and mine threats, and ability to land on almost any shoreline. These capabilities are found in the hovercraft. The stable hovercraft delivery platform can rapidly transport Marines over long distances without undue fatigue, whereas a slow EFV type deliver system will flounder in adverse sea states.

Hovercrafts create virtually no water displacement, acoustic or magnetic signature, and therefore are not threatened by mines and submarines - the perfect vehicle to penetrate an A2/AD environment. According to a U.K. Royal Marines Commanding Officer, the hovercraft offers 80% more landing opportunities than conventional landing craft.¹⁹ The operational dilemmas imposed due to increased tactical reach are extraordinary whether it be a littoral maneuver or theater entry.

The Navy currently operates about 80 hovercrafts or LCACs, Landing Craft Air Cushioned, since initial fleet entry starting 1987, but they have reached their 20 year end of service life.²⁰ The replacement for the LCAC is the Ship-to-Shore Connector (SSC) which is an upgraded LCAC but specifically designed to transport the M1A1 Abrams tank of 74 tons.²¹ The estimated \$4 billion SSC contract for about 80 craft, equating to \$50 million per unit, will probably have comparable range to the LCAC.²² The LCAC's range is 200 miles.²³ As the first SSCs will not be ready to deploy until fiscal 2019, a Service Life Extension Program (SLEP) of the LCAC is ongoing.²⁴ The SLEP will add 10 years of additional service life to the maintenance intensive LCAC which requires 25 hours of maintenance work for every 100 hours of operation.²⁵ A typical LCAC SLEP contract is roughly \$8 million per unit.²⁶

However, neither of these U.S. Navy hovercraft programs have the range, stealth, fully composite construction or cost desired. Therefore, the commercial off-the-shelf (COTS) hovercraft currently being manufactured by EPS Corporation, the EPS M10, will be used as the ideal model. There are other American vendors that meet the general hovercraft capabilities, but only EPS manufactures a U.S. built, all composite fabricated hovercraft which will reduce radar profile, and the non-corrosive design is well suited for the harsh littoral environments. Off the shelf, the EPS M10 has 50kt speed, 500nm range, operable up to sea-state 4, can deliver 56 Marines or 8 tons disposable, and costs \$5.5 million.²⁷ Consider that the LCAC SLEP contracts are in the \$8 million range.

Two variants of the EPS M10 are proposed to further national strategy. The first is the Marine Delivery Vehicle (MDV) retrofitted with two machine gun emplacements and chaff launcher. The second version is retrofitted with two quad-box launchers of anti-ship missiles, two machine gun emplacements, chaff launcher, and crew served shoulder-launched anti-air munitions. This version is the Marine Expeditionary Reconnaissance Combatant (MERC) and will penetrate the close inshore and ashore zones to secure the area for follow on transports. Existing anti-ship missile systems can be installed in under 6 tons such as MBDA's MARTE MK/2N, medium range lightweight anti-ship system, including two quad-box launchers and below decks fire control system.²⁸ Another possible candidate is Raytheon's Griffin non-line of sight anti-ship missile system being developed for Littoral Combat Ship deployment.²⁹

BALANCING CAPABILITIES WITH MOST LIKELY SCENARIOS

Hovercrafts armed with missiles offer new capabilities to the defense strategy with respect to “deter and defeat aggression in anti-access environments” as spelled out in the *QDR*.³⁰ In the hybrid threat environment, the adversary will try to offset our strengths through non-traditional forms of warfare as viewed through the lens of the American way of warfare. Such methods may be protracted, use proxy forces, or non-state actors using high-end tactics and capabilities: in a word - irregular.³¹ The best means to adapt and confront the threat is...irregularly. Confronting the hybrid threat with non-traditional operations can confound and disrupt an enemy accustomed to the American way of warfare. In the littorals, the MERC can patrol, mitigate hybrid threats in advance, and conduct offensive irregular operations as a skirmisher.

A good historical example of a naval skirmisher is the WWII Motor Torpedo Boat, or PT boat of John F. Kennedy’s *PT-109* fame. JFK later remarked as President:

Small though they were, the PT boats played a key role...Naval strength must function from shore to shore and on inland waters where the mobility and flexibility provided by ships can be employed to support land operations. PT boats filled an important need in World War II in shallow waters...This need for small, fast, versatile, strongly armed vessels does not wane. In fact it may increase in these troubled times when operations requiring just these capabilities are the most likely of those which may confront us.³²

Over five-hundred PT boats were built during WWII and they primarily served in MacArthur’s South-West Pacific command where they saw action in Guadalcanal, New Guinea and even in the Philippines. Samuel Eliot Morison labeled them “useless” as a

torpedo boat as they had vintage WWI faulty torpedoes, but had nothing but praise for PT boats as a gunboat.³³ PT boats' favorite prey became supply barges that the Japanese resorted to using to resupply their far flung island garrisons. Barges would load up with troops and supplies at major bases like Rabaul and hide during daylight, dominated by Allied air, while "at night they ventured out, hugging the reef-strewn shore to escape deep-draft enemy surface ships."³⁴ As Allied attacks intensified, the Japanese posted artillery along the barge routes to protect the sluggish vessels, but could not deter the audacious PT boats.³⁵

The MERC can be viewed as actually fulfilling the Littoral Combat Ship (LCS) role as outlined in "Meeting the Anti-Access and Area-Denial Challenge" published in 2003. The co-author, Robert Work, highlights the LCS as a key program in counter-anti-denial (AD) plans to operate in the "dead zone" to challenge "submarines operating close to the coast, small fast attack craft armed with missiles, and mines." The dead zone extends from the shoreline to some 25-50 miles to sea and is characterized by shallow water. In the future networked battle fleet, the LCS would "shoulder the burden of in-shore counter-AD tasks and screen" the fleet. The LCS's envisioned small size and small crew would allow the Navy a low-risk naval presence in high-risk areas.³⁶

Arguably, the Littoral Combat Ship at \$437 million, seventy-five sailors, and nearly 400ft length failed in concept implementation. Whereas, the low cost MERC will add true scalability for littoral maneuver success – in the distributed naval network battlefield, the strength and endurance of the network lies in the numbers of nodes. Although the use of unmanned vehicles can round out a network, UAVs can never reach the point of replacing the warfighter on the scene. Adding a true littoral combatant capability to the U.S. military

portfolio is one step in rebalancing to meet the future threat.³⁷ Another functional role for the hovercraft and perhaps more enduring is partner capacity-building.

PARTNER CAPACITY-BUILDING

The *National Security Strategy* calls for investing in the capacity of strong and capable partners to meet an uncertain future where the most likely and lethal threats will emanate from failed or fractured states.³⁸ A state of lesser means is generally precluded from buying high-end platforms. Qualitatively, most littoral states have neither the depth of trained personnel to effectively man and fight large expensive combatants, nor the shore infrastructure and logistical systems for end-to-end support. The hovercraft's simplicity of operation precludes advanced maritime ship-handling training and the MERC's all composite material construction requires little maintenance in the harsh corrosive environments associated with the littorals. The U.S. military's MERC and MDV procurement may influence foreign decision-makers to do likewise and lower the barrier for partner capacity-building in the maritime domain by enabling Foreign Military Sales (FMS) at an affordable price.

Also, a commonality of platforms used by our partners will go a long way to an envisioned "1000 ship navy" in the global commons. The modularity of the MERC is practical to combined operations; foreign MERCs can plug and play into the battlefield network as skirmishers. As a skirmisher, advanced integrated fleet operations training comparable to USN standards would not be required. The Global Maritime Partnership stated in *A Cooperative Strategy for the 21st Century Power* seeks a cooperative approach to maritime security, promoting the rule of law by countering piracy, terrorism, weapons

proliferation, drug trafficking, and other illicit activities.³⁹ These activities can be best handled by using hovercrafts dispersed in quantity. Summarily, a U.S. exported version of an armed hovercraft will offer commonality for the common good of collective security.

Additionally, the five man crew of each MERC, its low maintenance, and operational range make it a perfect asset for permanent strategic forward basing to further mil-mil engagement and increased forward presence. As opined by Brian Burton, “The political signal sent by US engagement with partner militaries may be more important than any improvement in host-nation capabilities it may produce by showing American commitment to security and stability in key regions of the world.”⁴⁰ To this end, the first five Marine Corps Flotillas, consisting of one squadron of 10 MERCs and one squadron of 10 MDVs, should be homeported in: Bahrain, Muscat Oman, Da Nang Vietnam, Palawan Philippines, and Nigeria (less a MERC squadron).⁴¹ Homeporting Marine Corps Flotillas in Vietnam and Philippines are critical balancers to a rising China and possible conflict over South China Sea resources. It represents a counter to PRC’s budding Anti-Ship Ballistic Missile program and assists in sea control in this near-future hotspot where the unrealized hydrocarbon resources are claimed by seven maritime countries. Forward basing of Marine Corps Flotillas would be clarion defensive signal of American commitment to long term stability in the region.

Permanent forward presence will also and enable rapid support of mission-tailored maritime forces surged in times of crisis, while the low military footprint can minimize negative aspects of U.S. military presence in a host country. Moreover, the MDV can be fully utilized in host nation assistance, whereas LCACs are under-utilized in the well-deck of a ship. Using rough estimates, for the cost of two Littoral Combat Ships, forty MERCs and fifty MDVs can be acquired - each hovercraft a node in foreign relations to both deter and

build partner capacity, but more importantly a node to strengthen the distributed naval battlefield network in the chaotic littorals should deterrence fail.

In this foreign relations aspect, the Marine Corps is well suited. The Marines excel in Public Affairs - a legacy set in place by General Lejeune when he reinvented the Corps during the inter-World War years. No service is more attuned to impress a positive American image on mil-mil relations, especially at the junior level where most of these relations are conducted. This is not an exercise to find the Marines a new job, rather an attempt to match the best quality to the capability desired - Marines have set the highest standard of combat leadership.

Conceptually, the MERC is a close-in fighter that will attrite and harass the enemy.⁴² The MERC will use its speed to aggressively engage the enemy and cause disruption in order to get within the enemy's Observe-Orient-Direct-Action cycle. As an amphibian, the MERC can go ashore, shutdown, and wait in ambush. In the chaotic littorals, the qualities of initiative, courage, and aggressiveness will be required - all qualities found in young Marines. The Marine Corps have honed these attributes over 10 years of recent kinetic conflict. Similarly, the contemporary operating environment and COIN has imparted patience, agility, and engagement skills. The modern battlefield requires quick decision making skills and independent action in complex ambiguous situations as penned by General Charles Krulak in *The Strategic Corporal: Leadership in the Three Block War*. Such are the demands of the chaotic littorals (i.e. South China Sea).

Each Marine Corps MERC will have five "strategic corporals": an OIC (0-1/0-2 rank), a non-commissioned officer co-pilot, a Navy navigator, and two junior enlisted

weapon operators/load masters. A tour of duty should be a graduated 18 month training and deployment cycle: in sequence, three months of hovercraft training INCONUS, three months deployed in Nigeria, three months of missile system training INCONUS, and nine months deployed in another flotilla location.

ALIGNING WITH FUTURE CAPABILITIES

Permanent forward basing of Marine Flotillas in strategic locations will also help littoral maneuver operations within their 500nm range. Similar to the Marine Expeditionary Brigade marrying-up with its Maritime Prepositioning Ship Squadron, a Marine Flotilla can marry-up with an at-sea Amphibious Ready Group (ARG) to scale-up its operational potential. An ARG nominally consists of an amphibious assault ship (LHA or LHD), an amphibious transport dock (LPD) and a dock landing ship (LSD).⁴³ Each platform carries some type of amphibious capability: 0 to 3 LCACs, 2 LCACs and 14 AAVs, or 2 to 4 LCACs respectively.⁴⁴ Recalling the limited water range of the AAV, it is advantageous to embark fighting vehicles specifically designed for land warfare. Organic LCACs can deliver these fighting vehicles safely past minefields, MERCs will sanitize the littorals and maintain screening duties while MDVs deliver Marines ashore from the ARG's well-decks. After ground units have mitigated any anti-air threats near the shore, the ARG's organic rotary lift assets can assist.

Any amphibious force structure discussion needs to integrate future initiatives where hovercrafts are relied upon to a greater extent. The future seabase will include three Mobile Landing Platforms (MLP).⁴⁵ Each MLP is based on the Alaska-class crude oil carrier to be a "pier in the ocean" with first ship delivery expected in FY 2013.⁴⁶ As the seabase's

distribution hub, each MLP will have up to three internal hovercraft “lanes” for rapid onload/offload transfer.⁴⁷ Each MLP will be capable to transport six LCACs.⁴⁸

The MLP is to be accompanied by the new amphibious ship, LHA(R), designed to carry the JSF-35 and MV-22 for aviation support. However, the initial units of the LHA(R) will have no well-deck. Permanent forward based Marine Corps Flotillas assist in lift capability. Additionally, littoral partner nations with a common MDV platform can provide operational assistance in the less provocative transportation role.

This modular approach should also be used to the future \$4 billion SSC program in order to add flexibility and meet future fiscal goals. The \$50 million per SSC is largely driven by the requirement to lift the M1 Abrams tank. Less the strategic lift requirement for tanks, perhaps the balance of total tonnage amphibious throughput can be achieved with smaller but cost efficient COTS hovercrafts in quantity. EPS Corp can reach peak production of 10 EPS M10 units per 24 months and can possibly license out proprietary construction rights for rapid procurement if less than a 10 year total production run is desired.⁴⁹ In comparison, the LCAC program ran from 1987 to 2001.⁵⁰ MDVs should be procured first as the MERC missile system incorporation will take some design rework or can await for the Raytheon’s Griffin prototype testing to be complete to leverage fleet commonality.

Finally, the hovercraft has the ability to further the goals of all grand strategies, whether be it liberal internationalism, or a future isolationist, primacy, or selective engagement policy. The hovercraft’s modularity, lethality, forward presence, and low cost make it practical across shifting state administrations. Its versatility across the range of

conflict makes it a scalable instrument of national power. On the high-end, it offers fast compact naval power to reinvent the skirmisher role. On the low-end, tremendous opportunities abound such as Coast Guard applications for homeland defense, recurring HA/DR missions, commerce enforcement, and at-sea rescue.

RECOMMENDATIONS

- Procure three EPS M10s for evaluation and halt further LCAC SLEPs.
- Reevaluate SSC procurement needs considering other capabilities such as Joint Logistics Over-The-Shore and COTS.
- Investigate basing rights to deploy five Marine Flotillas.
- Embark each Amphibious Ready Group with 4 AAVs and 10 Infantry Fighting Vehicles (IFV)
- Replace remaining balance of 1057 AAV inventory with existing IFVs or the Army's future Ground Combat Vehicle in joint procurement.

RISK?

As with all innovative startups, it has risk - not the monetary kind associated with commercial or private venture startups because the venture capital is relatively low in comparison to other national security outlays, miniscule even. The risk is internal within the Navy-Marine Corps team. For the Navy, there is possible risk within its intra-service parochial communities; will surface naval leadership view the MERC as competition to big hulled ships? Certainly Marine Corps encroachment on naval warfare would be suspect. The Corps' risk lies in its ability to liberate itself from cognitive attachment to the WWII style frontal amphibious assault as their sole *raison d'être*.

As in the past, visionary leadership akin to General Lejeune's is necessary to realize the opportunities presented by innovation today - otherwise risk being fodder in years to come to creative-destruction forces imposed by fiscal restraints and the hybrid operating environment. One example of unrealized innovation was effective tank utilization by the U.S. Army post-WWI. It was a younger Eisenhower and Patton who advocated for the unconventional use of tanks besides infantry support – mobile warfare. They were threatened with court-martial for their commitment to innovation. Then in 1920 the Tank Corps they commanded was abolished and incorporated into Infantry. Of course it was the German army that first successfully capitalized on blitzkrieg warfare.⁵¹

CONCLUSION

This paper started out reasoning against staying the course to find a more affordable amphibious tracked fighting vehicle. Hovercrafts delivering fighting vehicles are just as capable, if not better, in leveraging OMFTS – using the sea as maneuver space is the overarching concept or the way Maritime Strategy is to be implemented as stated in *Naval Operations Concept 2010* (NOC 10).⁵² Next was presented the MERC and MDV venture startup for permanent strategic forward basing to better support littoral maneuver and national security strategy. This method of reasoning is out of necessity because, in the words of Mac Owens, “strategy conceptualizes resources as a means in support of policy”.⁵³ Otherwise, capabilities are incoherent and impractical. Amphibious capabilities need to be analyzed with the same lens especially when lean budgets portend tough choices to procure means to ends.

A broad approach to frame the force structure question can help glean innovation versus a narrow reliance on technology to satisfy niche needs. Thus, the EPS M10 hovercraft derivatives present themselves as a versatile, cost-efficient force structure addition - providing credible littoral maneuver deterrence, full spectrum mission capabilities for the threats of today and tomorrow, and the ideal partner nation naval capacity-building platform. Marine Flotillas offer an amphibious capability that is more aligned with the *National Security Strategy*, and *QDR* as specified by our nation's leaders. More importantly, they represent an amphibious force structure addition in alignment with how we intend to implement these strategies as per the core capabilities delineated in *NOC 10*: Forward presence, Maritime Security, HA/DR, Sea Control, Power Projection, and Deterrence – a balanced fleet for peace and war and designed to go in harm's way, not a harbored fleet in being.

¹ Termination costs of \$185 million have already been funded. Otto Kreisher, "Legislative Limbo," *Sea Power*, Vol. 53 (November 2010) p 22.

² Andrew Feickert, "The Marines' Expeditionary Fighting Vehicle: Background and Issues for Congress," CRS Report RS22947, 01 Sept. 2010, p i, <http://openers.com/document/RS22947/>.

³ General Amos statement, 6 January 2011, on cancellation of EFV Program accessed at <http://www.marines.mil/ontherecord/Pages/EFV.aspx>.

⁴ Robert M. Gates, remarks as delivered, Navy League Sea-Air-Space Exposition, 3 May 2010, accessed at <http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1460>.

⁵ Jeter A. Isely and Philip A. Crowl, *The Marines and Amphibious War: Its Theory, and Its Practice in the Pacific* (Princeton, NJ: Princeton University Press, 1951), p 10-11. Russell F. Weigley, *The American War of War: A History of United States Military Strategy and Policy* (Bloomington, IN: Indiana University Press, 1973), p 258-260.

⁶ Weigley, *The American Way of War*, p 254-258.

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¹⁰ Feickert, "The Marines' Expeditionary Fighting Vehicle," p 1.

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standard landing craft - LCVP – which was essential to winning the war. Robert Coram, *Brute: The Life of Victor Krulak, U.S. Marine* (NY, NY: Little, Brown and Company, 2010), p 61-87.

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²⁰ Gidget Fuentes, "U.S. Navy Upgrades LCACs, Adds 10 Years' Service," *Defense News*, 15 March 2010, p 34.

²¹ Roxana Tiron, "Going Ship to Shore," *Sea Power* 53, no.5, p 62.

²² Ibid.

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²⁷ 40kt with full load. EPS Corp source data from EPS Corp CEO, Francesco A. Musorrafiti, moose@epscorp.com. Accessed at <http://epscorp.com/businessunits/navysystems/epsm10.html>.

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³¹ QDR, p 8.

³² Robert J. Bulkley, *At Close Quarters: PT Boats in the United States Navy* (Washington DC: U.S. Govt Printing, 1962) p vii.

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³⁴ Ibid, p 165.

³⁵ Ibid.

³⁶ Andrew Krepinevich, Barry Watts and Robert Work, *Meeting the Anti-Access and Area Denial Challenge* (Washington DC: Center for Strategic and Budgetary Assessment, 2003), p 45.

³⁷ Hovercrafts' resiliency to the mines and submarines make it ideal host platforms for remotely operated mine and submarine hunter-killer vehicles.

³⁸ Barack Obama, *National Security Strategy* (Washington, DC: The White House, May 2010), p 26. QDR p 8. Gates speech 01 FEB 2010 on Defense Budget/QDR Announcement accessed at <http://www.defense.gov/speeches/speech.aspx?speechid=1416>

³⁹ GEN James Conway, USMC, ADM Gary Roughead, USN, ADM Thad Allen, USCG *A Cooperative Strategy for 21st Century Seapower* (Washington, DC, October 2007).

⁴⁰ Brian M. Burton, "Looking Beyond EFV," *United States Naval Institute Proceedings*, vol. 137 (January 2011): p 58-62.

⁴¹ Assumption is that Marine Corps Forces Central Command will forward deploy a one-star general HQ in Bahrain, see Dan Lamothe, "Commandant maps out force review criteria", *Marine Corps Times*, 31 August 2010, <http://www.marinecorptimes.com/news/2010/08/marine-force-review-comway-082910w/>. Each Marine Flotilla should include 4x M2.2s which are much smaller hovercraft for auxiliary support.

⁴² Historically Marines have been the close in fighting arm of the Navy. In days of sail, Marines took position in the yardarms to provide suppression fire from above. Marine officers wore a quadrafoil on top of their covers to prevent sharpshooters on the masts from shooting them and still retain the tradition.

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- ⁴³ Naval Operations Concept 2010: Implementing the Maritime Strategy (Washington, DC, 2010), p16. Accessed at <http://www.navy.mil/maritime/noc/NOC2010.pdf>.
- ⁴⁴ Navy.mil, "Amphibious Assault Ships," http://www.navy.mil/navydata/fact_display.asp?cid=4200&tid=400&ct=4.
- ⁴⁵ Milan Vego, *Naval Forces*; 2010, Vol. 31 Issue 6, p 17.
- ⁴⁶ Navy.mil, PEO Ships Public Affairs, "Navy Awards \$115M Mobile Landing Platform Advanced," 27 August 2010, http://www.navy.mil/search/print.asp?story_id=55594&VIRIN=82852&imagetype=1&page=1.
- ⁴⁷ Ibid.
- ⁴⁸ Geoff Fein, "Navy to begin competition for Mobile Landing Platform in coming weeks," *Defense Daily*, 15 July 2008, Vol. 239, Iss. 10.
- ⁴⁹ Per conversation with EPS Corps Chairman/CEO/President, Francesco A. Musorrafiti, on 08 January 2011.
- ⁵⁰ Gidget Fuentes, "U.S. Navy Upgrades LCACs, Adds 10 Years' Service," *Defense News*, 15 March 2010, p 34.
- ⁵¹ Michael Korda, *IKE: The American Hero* (NY, NY: Harper Perennial, 2008), p 147-155.
- ⁵² Naval Operations Concept 2010: Implementing the Maritime Strategy (Washington, DC, 2010), p 1 and 13.
- ⁵³ Mackubin Thomas Owens, "A Balanced Force Structure to Achieve a Liberal World Order," *Orbis*, Spring 2006, p 311.