

Rethinking Mobile Reconnaissance

A family of small platforms to win the reconnaissance and counter-reconnaissance fight in the maritime security area

by Maj Jacob Clayton & Col Michael Nakonieczny

“There is no piece of equipment or major defense acquisition program that defines us ... we are not defined by any particular organizing construct ... we are defined by our collective character as Marines and by fulfilling our Service roles and functions.”¹

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wheeled, manned armored ground reconnaissance units are the best and only answer—especially in the Indo-Pacific region.”⁶

What reconnaissance platforms best contributes to the concepts mentioned

in the *Commandant’s Planning Guidance: Distributed Maritime Operations, Expeditionary Advanced Base Operations, and Littoral Operations in a Contested Environment?* This question is challenging because it aims at the gap between

The Marine Corps is not defined by the pieces of equipment it uses. Similarly, the new acquisition program for the advanced reconnaissance vehicle,² which takes strong design cues from its predecessor the LAV,³ does not define light armored reconnaissance.⁴ Given the *Commandant’s Planning Guidance*, does the current wheeled and armored conceptual design for the advanced reconnaissance vehicle meet the requirements to conduct reconnaissance, counter-reconnaissance, and security operations in the maritime environment?⁵ Gen David H. Berger remains, “unconvinced that additional



Platforms to conduct reconnaissance and counter-reconnaissance in the maritime security area. (Photo by SSgt Donald Holbert.)

the desired *ends* and actual *means*—the vision of reconnaissance and counter-reconnaissance activities in the maritime security area and the platforms required to conduct those activities. To deliver the value that the *Commandant's Planning Guidance* requires, the Marine Corps cannot replace the LAV with a single vehicle. Rather, the Marine Corps should design a family of unmanned and minimally manned reconnaissance platforms to operate in the maritime security area. These new capabilities require the transformation of light armored reconnaissance units organized around a single mobility platform to a new unit, a mobile reconnaissance squadron, organized around multiple mobility platforms.

"[The] contact, blunt [layers] ... are, respectively, designed to help us compete more effectively below the level of armed conflict; delay, degrade, or deny adversary aggression."⁷

Mobile Reconnaissance in a Maritime Environment

Reconnaissance platforms and units should enable Marine littoral regiments to conduct its mission in the maritime security area. So, the platform design concept should start with defining the activities and the operational environment. *MCDP 1-0, Operations*, defines reconnaissance activities as gathering, "information on enemy forces, capabilities, and intentions and by denying the enemy information about friendly activities through counter-reconnaissance,"⁸ either by focusing on an adversary's capability or key terrain. The maritime environment includes key maritime terrain, which could be an archipelago with ports, airports, straits, and landing sites for undersea

fiber-optic cables. The environmental constraints are the water surface and restricted terrain on islands with dense vegetation. Based on this logic, a reconnaissance unit requires water surface and light land mobility platforms to operate in the maritime security area. One could envision a mobile reconnaissance unit employing a watercraft that carries a family of multi-domain unmanned platforms to probe the key maritime terrain. Additionally, future challenges demand that every ground reconnaissance platform operate effectively in the information environment. Critical to operational success, each unit must demonstrate an ability to sense, make sense, and act in an environment congested with state adversaries, non-state actors, and neutral populations. Any chance of success hinges upon a unit's ability to synthesize information gathered from an integrated mesh of multi-domain unmanned sensors, quickly analyze and disseminate that information in usable formats, and use both kinetic and non-kinetic measures to effectively engage a target. Further, only units that can combine their efforts with unmanned platforms together with allies and partners will generate enough additive effects to compete and win within the range of military operations.

"We must continue to seek the affordable and plentiful at the expense of the exquisite and few when conceiving of the future amphibious portion of the fleet."⁹

Lethality

Looking at the internal space, power, and weight constraints for any platform, a large, power hungry, and heavy wheeled armored vehicle design does not lend itself to accomplishing the required reconnaissance activities in a maritime environment. The current advanced reconnaissance vehicle design could remove components that take up space, power, and weight that are not needed for operations in the maritime security area. The turret and weapons system do not make the advanced reconnaissance vehicle lethal; the sensor and communications systems do. A chain-gun with a few thousand meters of range does not come close to the lethality of a naval strike missile traveling hundreds of thousands of meters. The turret, weapons system, and ammunition contribute to



Reconnaissance activities in the maritime security area will require a host of unmanned platforms and sensors. (Photo by Chief Boatswain's Mate Nelson Doromal, Jr.)

reduced internal space, reduced available power, and increased weight—all with a high center of gravity and increased signature. The weapons system should provide local security, a weapons system on a reconnaissance vehicle needs to be an immediate defensive weapon to allow a unit to egress and not become decisively engaged. That weapons system might look like a mini-gun with a high rate of fire, loitering munitions, or a low-altitude air defense system to protect against top-down munitions.

A watercraft reconnaissance platform offers a host of opportunities for activities in the maritime environment. Instead of using the space, power, and carrying capacity for a large weapons system with a limited range, a reconnaissance platform could instead carry a family of sensors and communications systems to relay information to the naval fleet expanding the operational area physically and in spectrum without the increased risk associated with large and expensive platforms. This mobile reconnaissance platform then contributes to sensing and cuing in the complex web of nodes to be lethal in a contested environment.¹⁰ The reconnaissance platform in this context is no longer a tactical vehicle; it becomes a persistent risk-worthy asset inside the adversary's sensor and weapons engagement zone. However, a reconnaissance unit requires sustainment to persist inside the sensor and weapons engagement zone.

Sustainment

During the Battle for Guadalcanal, ADM Ernest King realized that logistical concerns quickly became strategic constraints. The “tyranny of distance” affected the World War II U.S. Naval Fleet and will affect any modern fleet. However, when ADM King made that comment, the United States did not have the current network of mutual defense treaty allies in the Indo-Pacific with pre-existing overseas bases, as well as the U.S. territories in the Indo-Pacific. This infrastructure works well to support the large naval fleet. However, the “last tactical mile” of sustainment inside a sensor and weapons engagement zone might be a dilemma and will be

“So far as the United States is concerned, [the Pacific] is a war of logistics. The profound effect of logistics on our strategic decisions are not likely to have full significance to those who do not have to traverse the tremendous distances of the Pacific.”¹¹

the new profound effect on strategic decisions.

Sustainment is a core challenge with reconnaissance and distributed operations. Ideally, a mobile reconnaissance platform has a high-performance propulsion system with a low signature (thermal and audible), has multiple ways to refuel itself, and requires minimal maintenance. In order to achieve this capability, the watercraft platform

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design concept should include electric-drive propulsion and hydrogen fuel cells. A once nascent industry, the host of electric-drive class-8 semi-trucks with battery and hydrogen fuel-cells provides over 1,000 horsepower and 2,000 foot-pound of torque to a 20-plus ton vehicle while traveling 700 miles on a single tank of hydrogen.¹² Recharging the hydrogen tank takes fifteen minutes, and these fuel stations have mobile configurations to generate hydrogen at forward deployed locations. Electric

motors deliver propulsion for ultra-light tactical vehicles¹³ and watercraft.¹⁴ Electric-drive propulsion delivers on performance; however, this propulsion system requires a dense energy source. Energy sources like battery packs, compressed hydrogen, or de-oxidized aluminum will address the energy dilemma with continued research and development efforts from the Marine Corps and industry partners. These energy sources could theoretically enable a watercraft reconnaissance platform with its host of hydrogen powered sensor platforms to operate persistently inside the sensor and weapons engagement zone while reducing the risk-profile associated with a military-grade fuel tether to the naval fleet. To further reduce risk to the fleet, electric-drive propulsion eliminates many materiel readiness and sustainment issues associated with diesel propulsion systems. The mobile reconnais-

“As the preeminent littoral warfare and expeditionary warfare service, we must engage in a more robust discussion regarding naval expeditionary forces and capabilities not currently resident within the Marine Corps such as coastal/riverine forces, naval construction forces, and mine countermeasure forces ... is prudent to absorb some of these functions, forces, and capabilities to create a single naval expeditionary force.”¹⁵



Electric-drive propulsion and hydrogen-fuel cells enable distributed operations. (Nikola Motor Corporation.)

sance platform could take advantage of these existing power-train technologies to address performance, sustainment, and maintenance issues. However, this value proposition is worthless unless the reconnaissance platform is able to operate in the maritime security area.

Mobility and Agility

The history of small boat employment to include Jeune École provides many case studies to generate options for operations in the maritime security area. The Marine Corps had a riverine force close to twenty years ago, so there is a precedent to establish a similar type of unit. Additionally, there are opportunities for small watercraft to integrate

with Navy, Marine Corps, and Coast Guard units, which fit the coastal riverine force that the *Commandant's Planning Guidance* calls for.

The Marine Corps could transform light armored reconnaissance from a single mobility platform unit to an all-domain mobility unit with light-land mobility and watercraft units supported by all-domain unmanned sensor, systems, and sustainment units. With these changes, one could envision a transformation of a light armored reconnaissance battalion into a mobile reconnaissance squadron that provides task-organized capabilities to a composite warfare commander. Once formed, this mobile reconnaissance squadron

can operate with littoral regiments, ground reconnaissance, air-defense, electronic warfare, or engineering units to accomplish naval objectives.

Deliver on the *Commandant's Planning Guidance*

The *Commandant's Planning Guidance* is not hedging investments for a contingency. So, the advanced reconnaissance vehicle should not hedge requirements for emerging conflicts across the globe. The family of reconnaissance vehicles must add value to the naval fleet in a maritime context and primarily in

"[H]owever, we will not seek to hedge or balance our investments to account for ... contingencies."¹⁶

the Indo-Pacific. This article articulates the *ends* (conduct reconnaissance and counter-reconnaissance inside the adversary's sensor and weapons engagement zone to enable the Marine Corps to execute its *contact* and *blunt* layer tasks as described in the *National Defense Strategy*). It also describes the *means* (a family of unmanned and minimally manned reconnaissance mobility platforms for a mobile reconnaissance squadron that supports a composite warfare commander). The *ways* (how we deliver these platforms) will be just as important. To deliver the value that the *Commandant's Planning Guidance* demands, we recommend the following actions:

- Establish an all-domain reconnaissance and counter-reconnaissance wargame series to model, simulate, and compare mobile reconnaissance squadron task organization options.
- Begin experimentation with a family of unmanned sensor platforms in the air, surface, land, and sub-surface domain with a priority of researching disposable sub-surface platforms.
- Based on the results from this experimentation, start the doctrine, or-

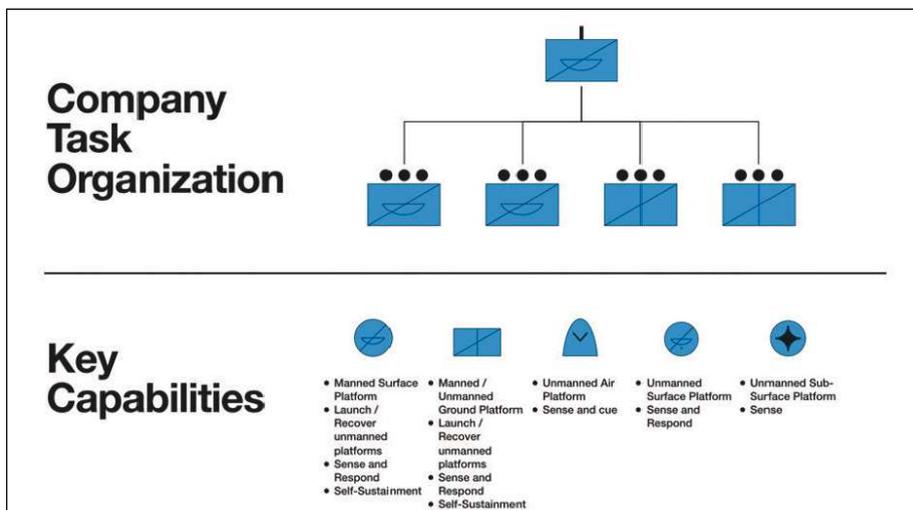


Figure 1. Task organization and key capabilities for the mobile reconnaissance squadron. (Figure provided by author.)

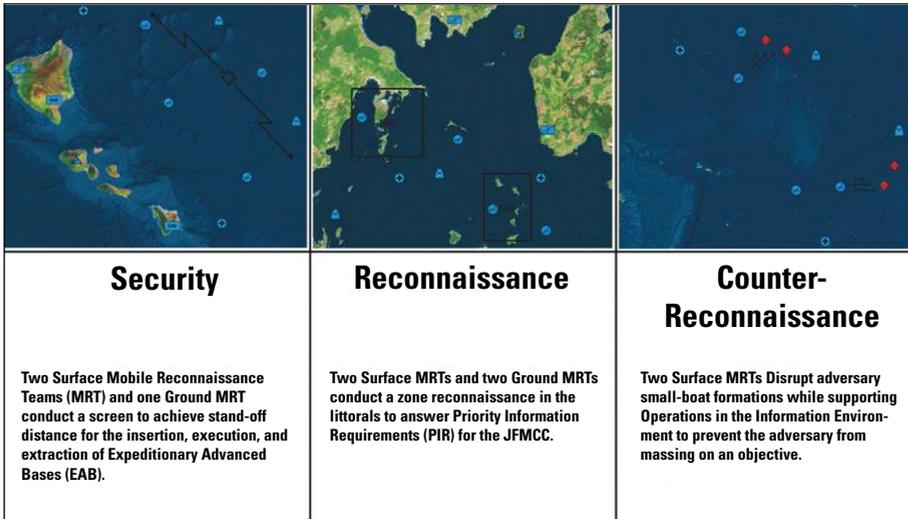


Figure 2. Examples of security, reconnaissance, and counter-reconnaissance operations in the maritime security area. (Figure provided by author.)

ganization, training, materiel, leadership, personnel, and facilities process for a mobile reconnaissance squadron.

- Establish a human performance research group partnered with industry experts to design the reconnaissance training programs.
- Conduct a comparative study of electric-drive propulsion platforms

ahead of the naval fleet can generate options for the supported commander. A high-performance minimally manned watercraft with a family of unmanned sensor platforms delivers the lethality, sustainment, mobility, and agility to operate in the maritime security area. This construct enables the proposed mobile reconnaissance squadron to accomplish

A high-performance minimally manned watercraft with a family of unmanned sensor platforms delivers the lethality, sustainment, mobility, and agility to operate in the maritime security area.

based on hydrogen and aluminum fuel sources from performance, energy, sustainment, and maintenance perspectives.

- Integrate the mobile reconnaissance squadron into Service-level force-on-force exercises with the Navy, Marine Corps, and Coast Guard.

Conclusion

A single platform does not define the light armored reconnaissance community whose character is to be the security area quarterback that senses, communicates, moves, and then shoots, in that order. Reconnaissance and counter-reconnaissance units

its mission by planning and conducting the sensing and counter-sensing fight, sensing and fusing information for the fleet persistently in all-weather with partners and allies.

Notes

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10. Defense Advanced Research Projects Agency, "DARPA Tiles Together a Vision of Mosaic Warfare: Banking of Cost-Effective Complexity to Overwhelm Adversaries," DARPA, available at <https://www.darpa.mil>.

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12. Information available at <https://nikolamotor.com>.

13. *Ibid.*

14. *Ibid.*

15. *38th Commandant's Planning Guidance*.

16. *Ibid.*



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