

Drone Wars

sUAS interoperability: past, present, and future

by Capt Erick Capulong

Within the past year, the Marine Corps has experienced drastic changes regarding force design. Some of these changes lend credence toward fundamental ideas, such as operating within the WEZ, using low signature and affordable platforms, and conducting distributed operations with focus towards independent small unit operations. Already, the Marine Corps has invested in proven systems that exercise these key fundamentals, to include the XRQ-13 Skyraider and the RQ-20B Puma. Low cost and easily deployable, these systems can be utilized to drastically improve a small team's capability in the "recon/counter-recon contest." Not to mention, the payload capability on these systems have high fidelity in examining targets on both the electro-optical and infrared spectrum. Employing small unmanned aircraft systems (sUAS) will enable units to exercise these fundamentals at the lowest levels. However, merging sUAS into the future tactical construct will require a level of aptitude akin to a Marine employing his rifle or executing a call for fire. Unfortunately, the fleet's programs are inadequate as current training and program management does not prepare an individual to employ sUAS as it was intended. The Marine Corps needs to change in this respect because a sUAS-proficient small unit team can quickly deploy their assets, conduct reconnaissance tasking, and collect targeting data which would enable the employment of long-range precision fires in the battlespace as well as system interoperability.

Currently, large UAS such as a MQ-9 or MQ-1 in the Fleet Marine Force is a high-demand, low-density asset. While extremely capable and reliable system, UAS rarely gets allocated below the bat-

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The RQ-7B Shadow can be employed to augment a Division's ISR collection plan. (Photo by LCpl Jesse Carter-Powell.)

talion level. Recent large-scale exercises have shown that high-end collections assets, such as UAS, will always go to the highest bidder. During MAGTF Warfare Exercise 1-20, 2d MarDiv held a force-on-force exercise that included two regiments and six battalions with attachments that augmented the major subordinate elements.¹ In addition, two MQ-9 Reapers, one MQ-1C Grey Eagle, and four RQ-7B Shadows were assigned to bolster the division's collection plan. These assets enhanced the collections plan at both the division and regimental levels but were only assigned

to battalions on a case-by-case basis. For the battalions, accessibility to these assets was sporadic, and support was only given to those with operational necessity. This anecdote highlights the status quo of collections in the Marine Corps. Thus, battalions cannot rely on external collections assets but must instead leverage those organic to their units. As the Marine Corps continues through its force redesign, operating in numerous but small littoral strike teams,² the need to streamline information across disaggregated units will be more prevalent. To remain rel-

evant, battalions will look to leverage equipment that provide faster and agile means of collection. This is where sUAS will find its niche and bolster a battalion's collection network as the RQ-7 did for a regiment or a MQ-9 for a division.

To illustrate how this capability could fit within a battalion's construct, envision a scenario involving a highly mobilized, combined anti-armor team (CAAT) equipped with a RQ-20B Puma and a well-trained sUAS operator. This team has an objective approximately ten km away, separated by dense micro-terrain that would take hours to navigate. With the ability to

through the community as a whole. This highlights an organizational issue within the community. As Force Design continues on its trajectory, sUAS capabilities, integration, and innovation will remain uncoordinated and incomplete unless substantial changes occur in how future sUAS operators are trained. This requires a personal investment and ownership from the units themselves and how they see their integration with current technology in the future fight.

Small UAS integration began when the Marine Corps proliferated sUAS during Operation IRAQI FREEDOM and Operation ENDURING FREE-

DOM.³ Regiments were outfitted with the Dragon Eye, which provided organic intelligence and surveillance. As technology advanced, the platforms increased in number and changed in capability. The growth in the program created standards in which sUAS operators could follow to face the Marine Corps' future challenges. In 2012, PMA-263 and Marine Special Operations Command (MARSOC) came together to institute the *Group 1 sUAS Training and Readiness Manual (T&R)* that spearheaded the curriculum taught at the schoolhouse today. While MARSOC currently acts as the program's syllabus sponsor, Training and Logistics Support Activities East and West (TALSA-E and TALSA-W) controls the training given to sUAS operators who will employ these systems in future conflicts. In the midst of Marine Corps Force Redesign, TALSA finds itself unable to keep up with the high demand required in producing operators that will supplement the FMF. School seat quotas are limited based on the number of available instructors and are prioritized based on operational necessity. Prioritization of school seats favor primarily Navy sUAS operators, deploying sUAS operators, and those from MARFORSOC. After these seats have been filled, students from units that rate the system, students from operational units, and students from formal schools fill the remaining seats. Additionally, TALSA runs the seat allocations through a conference with sUAS program managers from other units and allocates seats based on the aforementioned priorities. Because of the limited availability of seats and competing priorities, operational units tend to receive seats when they deploy. This creates gaps in a unit's operator base as program managers are unable to accurately plan for manpower shortfalls because of either sUAS operators leaving the unit or the outsourcing of operators because of competing unit priorities. This leaves the program managers with an inconsistent program and an operator base that is subject to seat availability and unit operational tempo.

An increase in TALSA's manpower personnel requirements would benefit the organization greatly. More specifically, TALSA needs a direct investment to its instructor base. Currently, school seats are prioritized because of small class sizes. Class sizes are small because smaller classes do not dilute the quality of instruction given per student. More instructors would equate to an increase quota on school seats without diluting the quality of the curriculum. As more instructors are made available to teach, this would increase the potential class size that instructors could handle during a given period of instruction. Subsequently, larger class sizes would open the aperture to meet the operator demand for the Navy, MARSOC, and the fleet Marine Force. More school seats will allow program managers to accurately handle their operator base due to manpower shortfalls within their respective units. As mentioned in the 2019 *Marine Corps Gazette* article "The Squad-Copter Dilemma,"⁴ the Marine Corps can "drastically increase the size of its TALSAs" by enabling Marines to become instructors. By bringing in Marine instructors, TALSA can increase their manpower and leverage the instructor's first-hand experience brought on through their deployments

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fly to a max distance of twenty km, the CAAT's Puma launches within minutes in order to identify named areas of interest and reconnoiter avenues of approach. The Puma's ability to fly long distances gives the CAAT considerable standoff without compromising its position. Simultaneously, the CAAT can collect targeting information with high fidelity. Furthermore, if the company or battalion's command and control (C2) node has a working Network-On-The-Move Point of Presence vehicle, the C2 node would be able to receive the Puma's video feed through the vehicle's VideoScout software suite, providing instant, shared situational awareness throughout the battalion. As the Marine Corps begins the shift toward the Pacific, units will need to assess their collections network and how information is shared between small unit teams scattered across the littoral battlespace. Drawing on the aforementioned CAAT scenario, sUAS possesses untapped potential. Units throughout the FMF have conducted isolated testing of these capabilities through internal small unit exercises, but rarely are these practices and procedures shared

and operations. Additionally, a Marine instructor's tactical expertise can help refine the curriculum to be more relevant for that future fight.

In addition to the manpower perspective, the sUAS community needs to improve on the training and the processes in which training is standardized. Foundational training is brought on by the TALSA's. However, as mentioned previously, the curriculum does not go beyond basic system application and the function of its uses. The aforementioned *Gazette* article, "The Squad-Copter Dilemma,"⁵ highlights the implications of these issues by mentioning that "battalions must reinvent the wheel when it comes to deconfliction and hold repeated classes with all of its operators." Having experienced this first hand at 2d Tank Battalion, I found that I had to reinvent my battalion's sUAS training curriculum, despite the program's existence since 2012. Currently, the schoolhouse only trains its students for one to two weeks—dependent on the system—before qualifying and releasing the operators back to their respective units. As an aviator who's flown and lead crews in Norway and the mountainous regions of Central America, a single week is not adequate to teach airspace deconfliction, practice crew resource management, and create the instinct to understand how to operate complex systems in uncertain environments. Additionally, the curriculum does not cover skillsets fundamentally important to how Marines should use this system such as call-for-fire integration, reconnaissance and collections, or targeting data acquisition for those Company fire support teams (FiSTs). The onus of training falls on the unit's program manager, which can vary in quality per unit. A new training curriculum, at a minimum, should cover these topics and be provided during a period of instruction longer than the current duration.

The entire Marine Corps would benefit from a standardized curriculum that could enable an operator to be tactically lethal. Small UAS operators need to be proficient in call for fire, target acquisition, airspace deconfliction, intelligence collections, battle damage assessment, and enemy recognition in

order to be useful. All these hard skills enable the appropriate firing agency, intelligence agency, or the battalion Forward Air Controller (FAC)/AirO. Additionally, understanding these skill sets develops awareness in mission planning requirements, communication and environmental considerations, and lost-link/contingency planning—all skills which vary by unit. While these skills are partially embedded in the Group 1 sUAS *T&R Manual*,⁶ units are not held accountable for its standards. To be affective in the fight of tomorrow, sUAS operators need to understand their systems and their applicable uses just as well as a Marine who can conduct a call for fire or fire his weapon. Having Marine instructors would help spearhead the curriculum, as they can help lead conferences in tactical development and refine the tactics, techniques, and procedures (TTPs) relevant to the units they support. This model could then be tested and refined until it matches the capability that the Marine Corps requires. Coming out of the schoolhouse, the goal should be that a Marine knows the system and be effective as he or she would with their weapon. This not only requires serious investment into training procedures but also personal investment from the units themselves, ranging from the person selected to manage the sUAS program to the manpower decisions invested into training potential operators.

Additionally, the sUAS community would benefit if units equally take ownership of the problem as quality and organizational ownership can vary. Small UAS Program Manager, in most units, is considered a collateral billet that garner's less attention than it requires. After graduating a sUAS course, the operator returns to a unit whose sUAS tactical acumen is only as good as the quality of the sUAS program he returns to. At best, the operator returns to a unit whose program manager is ran by an experienced FAC with an aptitude in UAS training and management.⁷ At worst, the operator returns to the program ran by a junior officer who is still figuring out the nuances of his primary billet. Not every unit has the luxury of an air officer/FAC. Lack of understanding of the billet, the nature of this

billet as a collateral, and the constant rotation through the billet does not help the program to become successful and enduring. Coupled with unit anecdotes of poor system use and functionality, the system's advantages are greatly undermined. However, examples across the Marine Corps have shown there are units who continue to innovate and improve on current sUAS system capabilities. In 2018, Marine Operational Test and Evaluation Squadron 1 (VMX-1) developed procedures in integrating sUAS with rotary-wing close air support. 2d Assault Amphibious Battalion conducted a proof of concept in 2018 of integrating sUAS operations with their Amphibious Assault Vehicles as they went ashore. At 2d Tank Battalion, we tested sUAS integration with a mobile fighting force, experimented in sUAS-provided video feeds at designated C2 nodes, and conducted data-downlink handoffs;⁸ 3/3 Mar pushed the envelope in further developing infantry/small unit sUAS integration.⁹ Unfortunately, these TTPs remain disaggregated and uncoordinated. As a community, the Marine Corps needs to crowdsource these TTPs and invest in the community as a whole. In order to maximize sUAS capability, we need to look beyond what the system currently provides and see the capabilities of what it could be. Only then can we stay driven to work through the issues that inhibit us from getting there.

As a collective organization, we can do better in providing the resources TALSA needs in developing a more robust capability. Currently, TALSA is oversaturated with high demand for sUAS training and responsible for seven different sUAS systems, four of which are overshadowed in capability by newer systems that need to be divested. They need less systems but more people. Additionally, at the battalion and regimental levels, program managers can do more in developing their unit's curriculums. Gen Berger highlighted in his planning guidance,

A likely vision of warfare centers on the recon/ counter-recon contest. This demands an agile, stealthy tactical system employing forces that are able to locate, target, and fire precisely first.



Additional MQ-9 Reapers in the Marine Corps inventory can provide capable, low-risk ISR platforms for the recon-counter-recon fight. (Photo by Senior Airman Isaiah Soliz.)

Exponentially greater precision and lethality of threat weapons demands we reduce exposure of our most expensive platforms and reduce exposure of Marines wherever possible.¹⁰

In the context of his comment, the Commandant was most likely referring to recent developments in UAS technology,¹¹ using UAS as a low-risk platform, and the additional acquisition of MQ-9s into the Marine Corps' inventory.¹² However, regiments, battalions, and companies can practice that "recon/counter-recon contest" in execution with current sUAS technology. This is key in staying relevant for the future fight.

In order to maintain relevance with the direction of Marine Corps Force Design, the sUAS program needs to radically adapt. The status quo of the sUAS Program is not adequate to keep up with the demand nor is it functionally relevant to train operators in which it is intended. Capts Welsh and Webb, co-authors of the "Squad-Copter Dilemma," describe similar issues when they mentioned that the Corps "will need to drastically increase its investment in the support structure behind sUAS."¹³ For now, the Marine Corps does not need newer investments in the latest quadcopters or fixed-wing sUAS. The systems are adequate to conduct the

necessary reconnaissance for a fifteen-man squad. Before introducing new technological assets, the Marine Corps needs to heavily invest in the program's support structure. More specifically, these investments should start at the program's foundation: the people it employs (manpower) and their product (training). All across the Marine Corps, different units have been testing and refining sUAS capability and integration. Case studies and experimentation of new sUAS TTPs are constantly being innovated. These anecdotes illustrate that units have not given up on these systems and are instead finding new ways to integrate and improve on current capabilities. We need to improve on the development and foundation of the community, TALSA, by investing in their support structure. We need to invest now in order prepare for the future fights of tomorrow. In doing so, we will be able to maintain relevancy for the future fight and operate as the Commandant had intended, bolstering our capabilities within that recon/counter-recon contest, reducing our exposure of our Marines, and enable the delivery of lethal and non-lethal effects on both land and sea.

Notes

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9. "The Squad-Copter Dilemma."

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