



UAV Single Vehicle Employment Platform

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As a commander of a headquarters and headquarters company (HHC) in an Infantry battalion, your job is inherently complex. In dealing with a myriad of sections and platoons all performing various functions, it can become overwhelming at times. This is especially so in an environment that is present in Iraq post-January 2009 and post-June 30 after the security agreement was implemented. As the HHC commander, I had numerous assets at my disposal, the largest property book in the battalion, including equipment and technologies that could provide combat multipliers to each of the rifle companies. I made it my responsibility to figure out how to effectively employ these systems to accomplish the mission.

In conducting combat operations in our battalion operating environment (OE) of Abu Ghraib and Nasir Wa Salam, just west of Baghdad, it quickly became apparent how useful Intelligence, Security and Reconnaissance (ISR) platforms could be employed to enhance the ground commander's mission set. Drawing from the Soldiers assigned to my tactical command post (TAC), which consisted of one Stryker vehicle, the battalion snipers, and various company HQ personnel, I had determined how to more effectively employ ISR assets organic to the company such as the Gas Micro Air Vehicle (GMAV) and Raven unmanned aerial vehicle (UAV).

My plan was simple. I wanted to streamline the process whereby a company designates a restricted operating zone (ROZ), activates it, and maintains it throughout an operation. I also wanted to consolidate the pilots of the GMAV and Raven into one vehicle, thereby making the team highly

mobile and capable of being attached out to supplement any operation. We were able to set this up as a "turnkey package" to any platoon or company that requested it. With this package, the gaining unit had little or no requirements for sustaining our small element. We request the ROZ from battalion, call in the ROZ from our Stryker, operate the UAV, broadcast the feed from the UAV platform to the ground commander's Stryker, as well as to the battalion tactical operations center (TOC).

We also report anything suspect to the ground commander from the UAV feed. The end result was that the Stryker was turned into a single vehicle UAV employment platform, seamlessly attached to any unit operation.

The ground unit now has an immediately responsive ISR asset above them, observing their disposition and detecting potential targets in a complex urban environment. This asset was the result of weeks of work put in on behalf of my NCOIC of the project, SSG Todd Patterson. We worked at coordinating with the field representatives at Tacticomp, Honeywell, and other technical experts to assist us in our set up of the UAV employment platform. The following is a menu of the various modifications and add-on's we installed both inside and outside of our Stryker. It not only transformed the vehicle into a mobile control platform for the Raven and GMAV but also acted as a broadcast platform. We simultaneously were able to transmit the feed from the Raven and GMAV, via the various towers set up in and around Abu Ghraib province, to the ground commander and the battalion TOC.



Photos courtesy of author

SSG Todd Patterson prepares the GMAV for an operation in Abu Ghraib, Iraq.



The workstation created for one Stryker is seen in its early stages. Various brackets and shelving had to be removed to free the system's eventual footprint.

A workstation was created in the left-hand side of the passenger compartment of the Stryker, opposite the radios, in much the same way a TACP (tactical air control party) Stryker is set up. This was designated as the UAV ground station from which the UAV could be flown, and the ground controller could observe the flight path and video feed, maintaining communication with all units during an operation. The setup would have been better accommodated with a command or TACP variant of the Stryker, where there are seats facing outward toward small workstations with ruggedized laptops and monitors. In either platform, the ground controller and UAV pilot sit next to each other and work closely together. This allows them to adapt to mission changes or receive requests from the ground commander, with whom the ground controller is speaking with via SINCGARS.

The Tacticomp system provides an information transmitting platform that offers many applications to enhance our UAV Single Vehicle Employment Platform concept. Real-time video can be transmitted from our platform to other vehicles, ground commanders and the battalion TOC using Tacticomp towers. We have incorporated the following features from Tacticomp in the platform. The basic vehicle install includes the following:

8db Omni Directional Antenna: This

antenna is permanently mounted on the vehicle. Although larger antennas (10-13db) are available, they require additional planning factors and were not required for our application.

VAP (Versatile Access Point): This 8-inch by 8-inch box is powered by the vehicle, backed up by a battery, and acts as the wireless router, and video injection point for Tacticomp operations. This is where the video-producing platform (GMAV or RAVEN) is connected. Additional video feed is imputable from many other sources.

T-1.5: (x3) These are handheld systems — essentially ruggedized PDA units — that can be used to view video, view maps, send text messages, and conduct voice communications with the addition of a headset and ground controller. These are helpful when the unit you are providing support to does not have Tacticomp installed in their vehicles. The ground commander can remain mounted, or dismounted, and view all feeds transmitted from the UAV. The ground commander can also communicate to the ground controller, who is sitting next to the pilot, and direct the UAV where to go, what to look at, and what to focus on.

T-6 Ruggedized Tablet Computer: This unit allows viewing and recording of the UAV surveillance video feed. A headset is available and allows communication to all similarly equipped Tacticomp holders with



The T-1.5 is a handheld system that can be used to view video and maps, send text messages and conduct voice communications.

headsets. Free text is an option, maps, and video feeds from multiple sources, such as a remote weapons station (RWS), J-lens and other surveillance platforms can be selected for viewing from a drop down-menu.

Battery Charger Unit: This unit charges four batteries that power the T-1.5, and provides backup power to operate all Tacticomp portable devices.

Tactisite: Similar to the Land Warrior system, this system is provided to ground commanders so that they can instantly view the UAV feed. This helps establish better situational awareness, as well as identifies



The T-6 ruggedized tablet computer allows the viewing and recording of the UAV video feed.



The Ghostbusters pack was developed to make the pilot's combat load more manageable.

any potential threat detected by the aerial system.

Tacticomp Controller: This controller allows remote control of the T-1.5, and the use of the headset for voice communication to the pilot and ground controller, as well as any other Tacticomp user with a headset.

Ground Control Station Pack: Before we developed the Ghostbusters pack, we had to wrestle with four different pieces of separate equipment. This made dismounted operations awkward. The new pack allows the ground data terminal, the T-1.5, and the unit that the pilot uses to control the aircraft to be truly portable. In addition we attached a video converter module (VCM). The VCM relays the video feed from the Raven or GMAV to the UAV employment vehicle. We mounted these four systems on an old ALICE rucksack frame. All four of these systems are attachable to your MOLLE gear; however, combat Soldiers must carry much more than just the GCS. He must also contend with his personal equipment and basic load as well. The Ghostbusters pack was developed out of necessity and made the pilot's combat load manageable.

The aforementioned systems, working

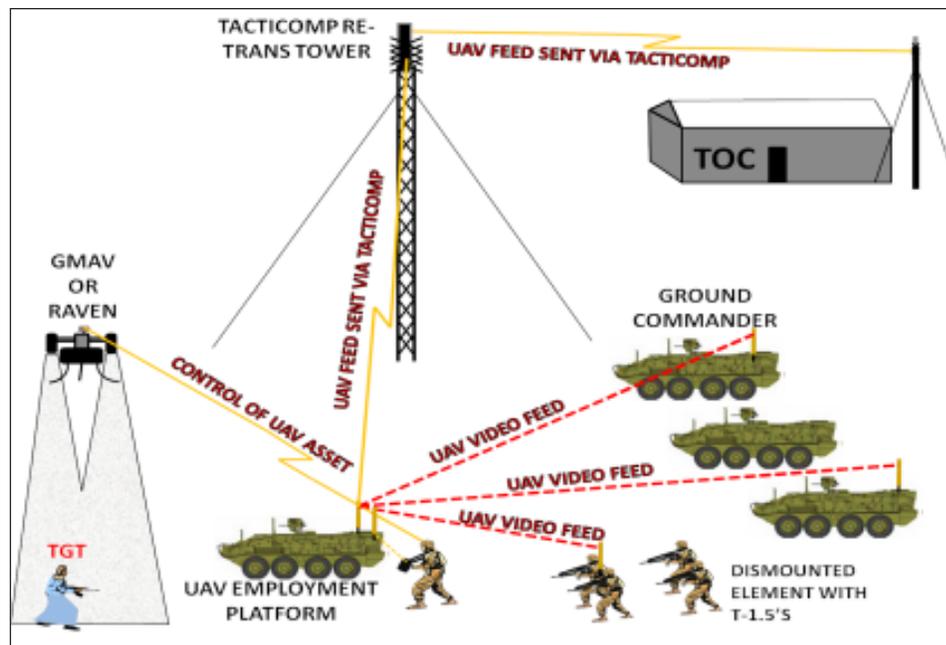


Figure 1

together for a well-trained pilot and observer, bring UAV assets to the lowest echelon possible, that of the ground commander.

GMAV or Raven video is transmitted to the UAV employment vehicle and other locations following the paths shown in Figure 1.

The parameters for operating UAVs are evolving slowly. On numerous occasions, ROZ and flight plans have been cancelled due to misunderstandings of the GMAV's capability. What brigade aviation elements (BAEs) may not yet understand is that the capabilities of the GMAV allow it to work in conjunction with air weapons teams (AWTs), Shadows, Predators, and most other air traffic in the airspace. Additionally it is capable of flying in adverse conditions, and when air is "red." Even with low visibility, the GMAV is able to fly low enough to provide cover for a dismounted element, or to use its camera to over watch specific targets. If nothing else, an object as peculiar looking as the GMAV in flight deters the enemy and makes them think twice about conducting an attack.

Two combat operations demonstrate the success of this concept. B Company, 2nd Battalion, 112th Infantry Regiment was tasked with a counter-IED (improvised explosive device), counter-IDF operation during limited visibility. They were task organized into three

Stryker vehicles and the attached UAV employment platform. The ROZ was coordinated, called in, and controlled by the Soldiers assigned to my TAC. Red Platoon of B/2-112 IN conducted a security halt, around the UAV employment vehicle, and my Soldiers set up the GMAV. We launched, and immediately flew the route of the counter-IED patrol. The GMAV flew the entire four-mile route, moved south to cover a canal noted for cache emplacement, and landed successfully. By conducting this type of operation using the GMAV, we were able to keep Soldiers out of harm's way by getting a better view with the infrared camera to detect potential sub-surface IEDs or cache emplacements that the human eye would not have been able to detect. Additionally, we were able to produce excellent imagery of each site and the route for future operations.

The second operation in which the UAV employment vehicle was assigned was a similar counter IED/ IDF patrol. Once B/2-112 IN exited, the platoon leader received an order to assist a nearby EOD team in the detection and disposal of a suspected IED. The platoon arrived, set up an outer cordon, and the UAV team quickly set up the GMAV and began to conduct their operation. The GMAV pilot, SSG Patterson, was able to assist the outer cordon in detection of possible triggermen, as well as assist EOD in a better top-side view of the potential IED.



During one mission, the GMAV maneuvers into position using its downward camera to view a suspected IED inside a tire in the battalion's area of operations.



During one mission, the GMAV flew the entire four-mile route, moved south to cover a canal noted for cache emplacement, and then landed.

Within the change of mission, we were able to quickly set up and launch the GMAV with little difficulty. Working in conjunction with the EOD team's robot, SSG Patterson was able to quickly determine that the suspected IED was nothing more than a tire with some trash in it.

These are just two of many successful operations supported by the UAV Single Vehicle Employment Platform. With more attention given to the notion, and perhaps an MTOE change, the concept will further evolve. A command or TACP variant Stryker should be dedicated; the manning requirement would be a driver (11B), vehicle commander (11B), a ground controller, two pilots trained on both the GMAV and Raven UAV systems (11B), and a communications specialist (25B). A Soldier designated and trained on all the peripheral Tacticomp systems and equipment (25B) is also needed. Lastly, two Soldiers would be assigned as the dismounted security element (11B).

It remains to be seen how far the Army's use of UAVs will unfold. My assumption is that we are seeing just the tip of the iceberg. New prototypes of the Raven and GMAV will roll off the production line frequently as the Army's use of UAVs matures. A newer version of the GMAV is already out and has an upgraded camera, which locks onto a specific target.

My hope is that this article assists other units in establishing their own UAV employment platform and gives them a recipe of how to do it. As technologies emerge making UAVs lighter, faster, smaller and stronger, the sky really is the limit.



The author observes while SSG Todd Patterson pilots the GMAV in support of a joint clearance operation in Iraq.

When this article was written, **CPT Gordon R. Kinneer** was assigned as commander of HHC, 2nd Battalion, 112th Infantry, 56th Stryker Brigade Combat Team, which was deployed in support of Operation Iraqi Freedom. He is a graduate of Valley Forge Military Academy and College, and Penn State University.

SSG Todd Patterson, GMAV pilot and NCOIC of the single vehicle UAV employment platform project, also contributed to this article.
