

Acquisitions

It takes a collaborative “village” to create capability

by LtCol Matthew S. Allen

The military community tends to focus on procurement in the acquisitions process but rarely gets informed of the entire research, development, and acquisition (RDA) teamwork that creates the conditions to deliver effective capability to the warfighter. Creating capability requires awareness of the evolving acquisition pathways, policy framework, budgetary limitations, and wide-ranging stakeholder partnerships to develop and mature a capable system to the warfighter. In contrast, the go-it-alone approach creates gaps in the acquisition process that impede or prevent capability delivery. This article is a case study of how Navy and Marine Corps Small Tactical Unmanned Aircraft Systems program office’s (PMA-263) leveraged emergent acquisition pathways for the Unmanned Logistics System-Air (ULS-A) Small acquisition strategy. Along with these evolving pathways and authorities, it was the dedicated teamwork under the RDA framework of multi-discipline organizations to mature capable solutions for unmanned logistics.

What Is ULS-A?

In 2019, LtGen Chiarotti, Marine Corps’ Deputy Commandant for Installations and Logistics, stated, “We need to identify ways to reduce manpower-intensive logistics requirements—reducing and removing manned transportation assets is critical.”¹ PMA-263 set out in 2019 to meet this task via the ULS-A Small acquisition initiative. The goal for ULS-A family of systems directly aligns within the 2021 Department of the Navy Unmanned Campaign Framework calling for “delivery drones” that are “essential components to the overall Navy and USMC logistics modernization efforts in support

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“The way a team plays as a whole determines its success.”

—Babe Ruth

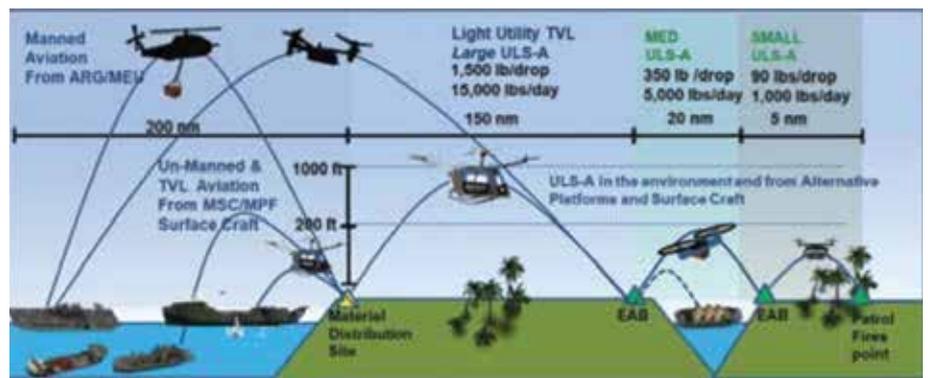


Figure 1. Family of ULS-A. (Figure provided by author.)

of DMO and EABO.”² As the initial step into the ULS-A family of systems, ULS-A Small would provide logistics and ground units with their own highly autonomous, unmanned aerial logistics systems that reduce risk while increasing delivery options to units at the last “tactical mile” (Figure 1). ULS-A Small, also known as Tactical Resupply Unmanned Aircraft System, focused on tactical-level logistics to move materiel of approximately 90lbs at least 10km. These systems are envisioned to operate organically within ground and logistics elements in support of tactical distribution effort, which will feed into the larger family of ULS-A and manned-unmanned teaming with

manned aviation and ground distribution resources. The ULS-A family of systems, starting with ULS-A Small, focused on providing a risk worthy, lower cost initial solution to integrate into the larger, more costly, and technically challenging family of systems.

Collaborative Analysis and Wargaming

In 2016, the Marine Corps Logistics Innovation Office (LIO) was given direction to research emerging solutions to lighten the infantryman’s load based on requirements in the 2015 Marine Expeditionary Rifle Squad Initial Capabilities Document. The LIO office recognized an opportunity to use “car-

go drones” to meet this requirement, but initial studies and developmental efforts across the commercial sector provided limited solutions.³ Marine Corps Warfighting Lab (MCWL), Marine Corps Installations and Logistics, and Marine Corps Operations Research Directorate conducted wargaming and analysis to determine the concept of employment and concept of operation for three types of Unmanned Logistics Systems (ULSs) at various units within the MAGTF. This initial analysis was expanded upon by multiple thesis submissions by military members in the Naval Postgraduate School (NPS) and War Colleges to determine ULS-A fielding cost, technology risks to fielding, and lift and range requirements to support tactical logistics requirements. The team effort of research and analysis groups helped establish firm requirements—one of the most difficult steps of the acquisitions process. Early coordination of wargaming, simulation, and analysis set the key parameters for ULS-A Small to become a logistics force multiplier vice logistics burden on the Marines.

Experimentation with a Joint, Multi-Agency Team

Initial research and demonstrations hosted by MCWL demonstrated potential solutions which led to increased partnership by the Marine Corps’ LIO and MCWL with Army Combat Capabilities Development Command and Army Futures Command. The in-depth research led the LIO team to realize that a go-it-alone approach would not work, and it would require technology development and maturation via rapid prototyping and experimentation with a broad coalition. Between 2016 and 2018, the Army and Marine Corps developed draft requirements, concepts, and strategies that shaped prototype systems.⁴ This teamwork and research set the momentum for approved funding in Future Year Defense Program for Research, Development, Test, and Evaluation up-front, planned funding profile for procurement and operations and maintenance sustainment through the Planning, Programming and Budgeting and

Execution System (PPBES). In 2019, the research, analysis, and dedicated funding helped to initiate an LIO & MCWL partnership with the Army to establish a three-year DOD Joint Capability Technology Demonstration. The DOD Joint Capability Technology Demonstration would research sensors, autonomy, and Concept of Operations of ULS-A family of system with specific focus on the ULS-A medium size capability (300–500lb payload with 35 to 200+ km radius). In addition, HQMC Installations and Logistics coordinated with HQMC Aviation to facilitate a Secretary Geurts memorandum assigning Program Executive Office (PEO) for Unmanned Systems and Weapons as the acquisition agent for the ULS-A Small-Medium capability area. In early 2019, PEO Unmanned Systems and Weapons assigned Group 3 ULS-A efforts to PMA-263 to enact a strategy to reach program of record viability and long-term program management.

... initial analysis was expanded upon by multiple thesis submissions ...

Leverage Educated Acquisition Process and Teams

PMA-263 ULS-A Small team leveraged recent, transformative changes in the authorities and pathways available to the acquisition community to rapidly deliver capability to the warfighter. These authorities and pathways include expansion of prize competition authority and funding limitations in the 2007 National Defense Authorization Act (NDAA) 10 U.S. Code 2374a and America COMPETES Reauthorization Act of 2010, OTAs expansion in the 2016 NDAA, and the Middle Tier Acquisitions pathway under the new 2020 Adaptive Acquisition Framework. PMA-263 set upon the task given to its office by HQMC, Combat Development and Integration, LCE Integration Division by tailoring its acquisition

strategy using the aforementioned authorities and pathways to deliver capable ULS-A Small systems within budget and schedule.

Fair and Open Prize Challenge

PMA-263 led a three-phased prize challenge fly-off event to support a rapid acquisition effort to deliver a critical resupply capability to the fleet (Figure 2). Specifically, prize challenge authorities under *Title 10 U.S. Code 2374a* provide a prize authority vehicle for all business entities, large and small, including those based internationally, with a prize pool of up to one million dollars per competition and the ability to receive follow-on contracts and agreements with the United States Government. The first phase started with a formal invitation to participate in the fly-off competition planned for 27-31 January in Yuma, AZ, a down selection phase from seventeen applications to six vendors for live flight demos. The second phase was participation in the fly-off competition at Yuma Proving Grounds, AZ, demonstrating the vendors’ prototype capabilities to meet draft ULS-A Small requirements. The third phase consisted of identifying vendors who meet the draft ULS-A Small Initial Capabilities Document requirements. PMA-263 provided a total of \$225k of prizes based on top three highest scored systems capable of transporting 60+ lbs of cargo in various configurations commonly found in company/squad resupply operations (ex: 5-gallon water can, ammo can/case, MRE case) through a 10 km radius and return unburdened to the launch site via automated launch, waypoint navigation, and automated landing. The prize challenge format attracted non-traditional vendors, motivated industry, and mitigated the risk to the government while maximizing the information gathering potential in a limited amount of time and funding. The ULS-A Small acquisition strategy using prize challenge authorities was recognized as the FY20 Competition Excellence Acquisition Team of the Year Award by the Assistant Secretary of the Navy (Research, Development, and Acquisition).

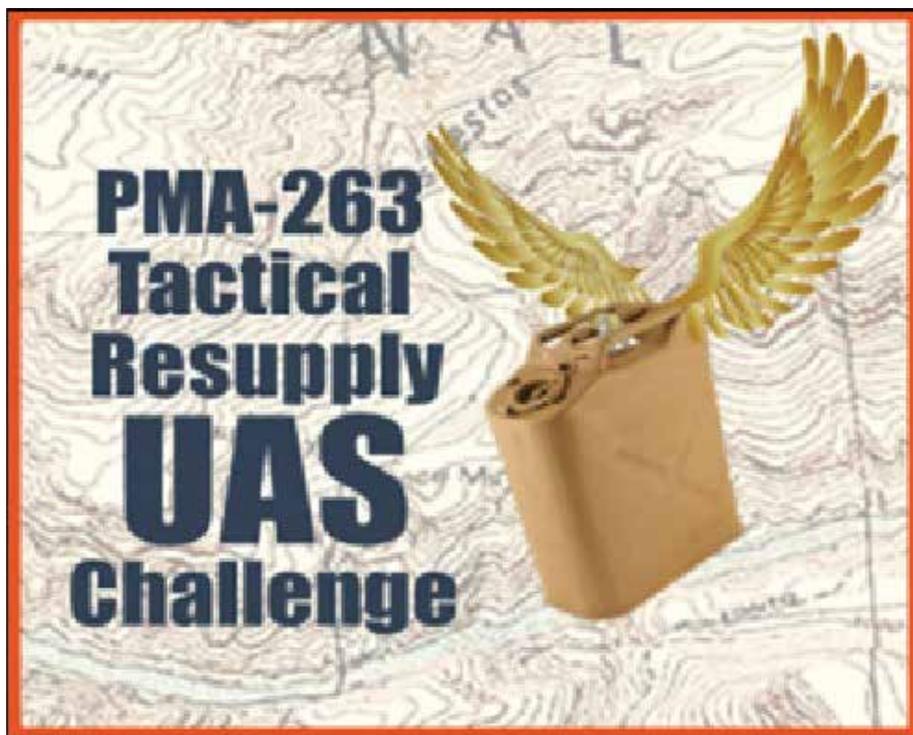


Figure 2. Tactical resupply unmanned aircraft system prize challenge logo. (Figure provided by author.)

Rapid OTA Prototyping

PMA-263 prize challenge results justified OTA prototype development to rapidly progress and mature ULS-A Small systems. Other Transaction authorities were created to give DOD flexibility outside the Federal Acquisitions Regulations to adopt and incorporate smart business practices that are flexible to create efficient prototypes directed towards rapidly enhance mission effectiveness. In FY20, PMA-263 proceeded to leverage the results of the Prize Challenge to award two Other Transaction agreements (Figure 3). The top three highest scored companies were involved with the OTA process, with one company acting alone and two of the vendors partnering together towards one system. Prototyping with multiple vendors ensured a competitive approach to maximize performance of the final product to the warfighter. A major focus was ensuring a user-friendly system that could achieve threshold requirements and required minimal training where Marines were “on the loop” vice “in the loop” for autonomous management. PMA-263 also set the conditions for production under the 2016 NDAA Title

10 U. S. Code, Section 2371b authority, which grants government owned prototypes with specific modifications that may result in the further award of a follow-on production agreement.

Experiment in the Marines’ Hands: Marine Corps Operational Test and Evaluation Activity (MCOTEA) & PMA System Assessment

PMA-263 coordinated with testing and evaluation experts under MCOTEA to enact Operational Assessment of prototype systems—a fusion of Developmental Testing/Operational Testing & Evaluation assessment-in-one. MCOTEA coordinated active-

duty Marines to rapid validate system training, Packaging, Handling, Storage & Transportation, software, Graphical User Interface, operations, and overall viability under the current draft requirements prior to further prototyping development or direct production decision determination. It was critical to get Marines’ feedback and see how Marines across multiple MOSs and ranks performed in conducting mock missions to deliver logistics at multiple locations at varying distances. Test participants were separated into two groups and assessed each system independently, switching between vendors halfway through the test event. The test event consisted of two iterations of New Equipment Training, a pilot test, and two record tests. The assessment discovered issues and concerns that needed to be addressed prior to field, such as transportation, electrical power generation necessary to recharge the batteries for sustained operations, transponder integration, and ease-of-use interface/software. This information allowed PMA-263 team to rapidly work with the vendors to address these issues, focus on the best performer during the event, and update the best prototype for a second phase field user evaluation by Marines during Large Scale Exercise. The emergent acquisition authorities and multi-agency teamwork ensured PMA-263 was on schedule for Initial Operational Capability (IOC) in FY23 to the Marines.⁵

It Takes a Collaborative Village to Create Capability

The ULS-A Small case study exemplifies that emerging acquisition authorities and broad coalition under



Figure 3. Prototype contract awarded platforms. Chartis Federal MK4-RX (left) and Service TRV-150 (right). (Photos provided by author.)

the RDA framework creates a strong acquisition strategy. The ULS-A Small acquisition approach aligns with the framework endorsed in the 2021 Navy Unmanned Campaign Plan (Figure 4) to ensure a wide partnership during the RDA process. ULS-A Small leveraged the initial steps of work across studies and analysis by NPS and research communities, informed by wargaming by MCWL, reviewed by modeling & simulations by Marine Corps Operations Analysis Directorate and NPS, and capable solutions identified by experimentation and exercises via prize competition, joint assessments with MCOTEA and Fleet Marines, and integration into Large Scale Exercise prior to final fielding determination. Multi-disciplined support from HQMC Department of Installations and Logistics, Headquarters Marine Corps Department of Aviation, Combat Development and Integration Combat Development and Integration, MCWL LIO, Naval Postgraduate School, Army Combat Capabilities Development Command, Innovation and Modernization Patuxent River (IMPAX), MCOTEA, Army Yuma Proving Grounds, and Program Executive Office for Unmanned Aviation and Strike Weapons created the conditions for ULS-A Small viability as an unmanned logistics solution at the “last tactical mile” for the warfighter.

Is ULS-A Small “Speed of Relevance” for the Warfighter?

An apprehension for acquisition programs is too many bureaucratic step-by-step processes or organizations involved that inhibits system fielding at the “speed of relevance.” Speed of relevance has many meanings but characterized by DOD leadership as being “better rigor, better relationships, better ideas, and getting them faster.”⁶ For the acquisition community, this comes across as a balancing act between the constraints of cost, schedule, performance, and the government PPBES funding process. Understanding the financial limitations, acquisition authorities, and technology viability to meet requirements allowed the ULS-A Small acquisition effort to



Figure 4. Department of Navy 2021 Unmanned Campaign Plan excerpt. (Figure provided by author.)

keep a focused, but expeditious pace to reach speed of relevance for the warfighter. The speed of relevance for ULS-A Small signifies a capable system that performs in the MAGTF sustainment concept of operations as a logistics force multiplier vice logistics burden on the Marines.

First, the ULS-A Small effort, like all programs, is inhibited by the PPBES processes. The PPBES process requires a minimum of eighteen months elapse between the time money is requested to be included in the President’s Budget to the time that the funds are available for obligation on a contract.⁷ This means that when initial review of ULS-A Small requirement was coming online in 2016-2017, programmed funding would not become available until 2018-2019 timeframe. MCWL and LIO branch did excellent work in the early years progressing potential fielding solutions through available research funding, but acquisition programs need multi-year, dedicated funding to create acquisition success. When programmed funding arrived in FY19, the ULS-A Small team was able to build a joint coalition to test, validate, and mature technology with industry and enact contractual pathways to reach IOC by FY23—less than four years from start to finish.

Second, ULS-A requirement stakeholders needed adequate time to coordinate with wargaming, simulation, research organizations, and industry to

determine performance requirements. Initial research by MCWL and LIO office in 2016 confirmed minimal industry development beyond small package delivery (~ten lbs) within controlled confines and short distances of urban environments.⁸ Technology maturation can take time if the DOD does not create the conditions (i.e., funding) to incentivize the industrial base. It takes time and dedicated effort to work across government agencies and industry partners to create awareness, align funding, and development of systems to meet the ULS-A mission and initial goals. For example, it is not surprising that Amazon has yet to field a viable drone delivery system even after it announced an experimental drone delivery service with great fanfare as part of a “60 Minutes” feature in 2013—unmanned aviation logistics is a complicated endeavor.

Third, PMA-263 met with the requirements stakeholders to determine baseline acquisition program priorities. The priority order was set as performance, schedule, and then cost. The focus on performance was to ensure ULS-A Small could meet Day-of-Supply for tactical units while also ensuring minimal manpower, high level of aviation safety, and “man on the loop” autonomy. Stakeholders understood that ULS-A Small was a unique ground forces managed aviation asset. It requires a high level of trust and confidence of a potentially lethal 250+ lb

hazard moving around the battlespace in close proximity to ground and aviation units. The PMA-263 prize competition process ensured a fair and open competitive process with direct engagement to traditional and non-traditional industry partners to help ensure best of breed prior to system fielding. The coordinated OTA contracts with the two lead companies were completed within three months and five months to rapidly enhance the development of the systems and deliver prototypes for government testing as soon as possible. At each step of the process, without direct engagement with each stakeholder, the final ULS-A Small product would never be as safe and above threshold requirements warfighters expect out of its acquisition community.

Finally, even though performance was the priority, schedule was still considered the second, major driver for the stakeholders to deliver capability within five years post initial funding (IOC FY23). PMA-263 contracted with both vendors to deliver prototypes above ULS-A Small draft Capability Development Document thresholds, but one of the vendors was unable to modify their design from the prize competition to safely operate and stay competitive with the other vendor during the MCOTEA Operational Assessment live-flights. PMA-263 created this competitive, “fail fast” approach to create the best system available to meet the fielding schedule. Even though PMA-263 would want to deliver capability yesterday, program of record determination is on schedule and budget to meet draft IOC/Full Operating Capability dates.

Major Lessons Learned

The ULS-A Small acquisition approach required a team effort across the DOD and industry using a tailored, informed strategy leveraging emergent acquisition authorities and pathways. The earlier a cohesive, multi-disciplined team is created around a requirement for capability; the more likely capability will rapidly reach the warfighter at the speed of relevance.

Data sharing of best practices, contractual options, and emerging acquisition pathways needs to be mandatory

for all acquisition efforts. Data of every acquisition process and major decision documents needs to be shared via Defense Technical Information Center to ensure DOD-wide awareness, lessons learned, and templates for others to emulate.

Fly-off Prize Challenges are an outstanding tool to rapidly validate technology feasibility, provide test ranges for OEM product showcase, and directly inject funding that breathe life into the specific capability of need’s industry. A funded prize challenge incentivizes industry to participate while also ensuring rapid validation of each vendor’s product ability to meet the warfighter’s requirements. The ULS-A Small prize challenge did not limit industry’s ingenuity to support unmanned logistics which ensured multiple design options and outside-the-box thinking to mature a best-of-breed solution.

The Partnership Intermediary Agreement such as the one created between the Naval Air Warfare Center Aircraft Division and the Georgia Tech Research Institute, called IMPAX, were instrumental in researching and communicating directly with government agencies, industry, academia, and test ranges to rapidly enact the ULS-A Small prize challenge. The partnership between research group and government agencies such as IMPAX needs to be expanded and promoted across the acquisition community.

The PEOs and Defense Acquisition University need to build additional awareness, training courses, and dedicated staff to support OTA contracts. The increase in dedicated OTA experts at Defense Acquisition University and PEOs to train and support acquisition members will proliferate the use of OTAs to rapidly contract for prototypes and production solutions.

Early integration of prototype assessment by the developmental test and operational testing communities were instrumental to keeping ULS-A Small a capable, safe platform prior to fielding, while also compressing the schedule to rapidly meet fielding timelines. Increased awareness and utilization of development test/ operational testing collaborative events will streamline ca-

pable product delivery to the fleet with a broad coalition of test experts and military user communities.

Conclusion

The ULS-A Small case study is but one of many acquisitions processes that requires focused research, funding, development and then acquisition to reach viability. The ULS-A team’s awareness of the acquisition pathways, policy framework, and stakeholder partnerships created the necessary conditions to mature and develop a capable unmanned logistics system at the speed of relevance. The acquisition community must continue to publish details of acquisition programs for all acquisition stakeholders to learn from and trust in broad coalitions, vice individual efforts for future acquisition success.

Notes

1. Connie Lee “Navy, Marine Corps Turn to Unmanned Systems for Logistics Support,” *National Defense Magazine*, (October 2019), available at <https://www.nationaldefensemagazine.org>.
2. Department of the Navy, *Department of the Navy 2021 Unmanned Campaign Framework*, (Washington, DC: March 2021).
3. Ibid.
4. C Anson and T Heffern, “Transformative Logistics Distribution,” *Marine Corps Gazette*, (March 2021), available at <https://mca-marines.org>.
5. Ibid.
6. Arpi Dilanian and Matthew Howard, “Modernizing at the Speed of Relevance: An Interview with Under Secretary of the Army Ryan McCarthy,” Army, (August 2018), available at <https://www.army.mil>.
7. *Department of the Navy 2021 Unmanned Campaign Framework*.
8. “Transformative Logistics Distribution.”

